

Studies on the terrestrial isopod crustaceans
in Japan. I. Taxonomy of the families
Ligiidae, Trichoniscidae and Olbrinidae

journal or publication title	Bulletin of the Toyama Science Museum
number	5
page range	23-68
year	1983-03-20
URL	http://repo.tsm.toyama.toyama.jp/?action=repository_uri&item_id=476

Studies on the Terrestrial Isopod Crustaceans in Japan

I. Taxonomy of the Families Ligiidae, Trichoniscidae and Olbrinidae*

Noboru NUNOMURA
Toyama Science Museum

日本産陸棲等脚目甲殻類の研究

I. フナムシ科, ナガワラジムシ科およびヒゲナガワラジムシ科の分類

布村 昇
富山市科学文化センター

日本の陸棲等脚目甲殻類, すなわちワラジムシ亜目に属する等脚類については, 現在まで Arcangeli (1927) および岩本 (1943) がややまとまった報告を行っているほかは, Vandel (1968, 1970) や Nunomura (1976, 1979, 1980) が若干の種の記載を行っているのにすぎず, その分類学的研究はヨーロッパ, アフリカ, 北アメリカ, オセアニアなどくらべて格段に遅れており, 未報告, 未記載の種類も多いものと思われる。当然, その生物地理学的研究も全く未開拓とっていい状況にある。ところで近年, わが国における土壌動物学や土壌生態学の興隆に伴ない, その分類学的研究に強い必要性が叫ばれるに至った。筆者は1974年以来, 日本各地の陸棲等脚目の研究に従事してきたが, ここにその成果を続報の形で報告する。観察した標本は総数約1万点に及び, その一部は筆者自身の採集にかかわるものであり, 他は, 土壌動物研究者からの寄贈標本や同定依頼標本である。また, 必要な場合には, 大阪市立自然史博物館や国立科学博物館からの借用標本も併せて研究した。第I報ではフナムシ科, ナガワラジムシ科およびヒゲナガワラジムシ科に属する19種について種名を決定し, 記載を行なう。本報告で扱った種は以下のとおりで, その中には8新種を含む。

フナムシ科	Ligiidae BRANDT, 1833
フナムシ属	<i>Ligia</i> FABRICIUS, 1798
フ ナ ム シ	<i>Ligia exotica</i> ROUX, 1828
キ タ フ ナ ム シ (新称)	<i>Ligia cinerascens</i> BUDDE-LUND, 1885
リュウキュウフナムシ (新称)	<i>Ligia ryukyuensis</i> , n. sp.
オガサワラフナムシ	<i>Ligia boninensis</i> NUNOMURA, 1979
ヒメフナムシ属	<i>Ligidium</i> BRANDT, 1833
ニホンヒメフナムシ (新称)	<i>Ligidium japonicum</i> VERHOEFF, 1918
チョウセンヒメフナムシ (新称)	<i>Ligidium koreanum</i> FLASAROVA, 1972
リュウキュウヒメフナムシ (新称)	<i>Ligidium ryukyuense</i> , n. sp.
ニホンチビヒメフナムシ (新称)	<i>Ligidium paulum</i> NUNOMURA, 1976
キヨスミチビヒメフナムシ (新称)	<i>Ligidium kiyosumiense</i> , n. sp.
イヨチビヒメフナムシ (新称)	<i>Ligidium iyoense</i> , n. sp.

*Contributions from the Toyama Science Museum No.28

ナガワラジムシ科(新称)	Trichoniscidae Sars, 1899
ホラワラジムシ属(新称)	<i>Hyloniscus</i> Verhoeff, 1908
ウエノホラワラジムシ(新称)	<i>Hyloniscus uenoi</i> Vandel, 1969
ヒトツトゲホラワラジムシ(新称)	<i>Hyloniscus unidentatus</i> Vandel, 1970
ツノホラワラジムシ(新称)	<i>Hyloniscus coronatus</i> , n. sp.
クラモトホラワラジムシ(新称)	<i>Hyloniscus kuramotoi</i> , n. sp.
ホンドワラジムシ属(新称)	<i>Hondoniscus</i> Vandel, 1968
ホンドワラジムシ(新称)	<i>Hondoniscus kitakamiensis</i> Vandel, 1968
チビワラジムシ属(新称)	<i>Trichoniscus</i> Brandt, 1833
チビワラジムシの一種	<i>Trichoniscus</i> (?) sp1.
チビワラジムシの一種	<i>Trichoniscus</i> (?) sp2.
ナガワラジムシ属(新称)	<i>Haplophthalmus</i> Schöbl, 1861
ナガワラジムシ(新称)	<i>Haplophthalmus danicus</i> Budde-Lund (1879), 1885.
ヒゲナガワラジムシ科(新称)	Olibrinidae Budde-Lund, 1913
ヒゲナガワラジムシ属(新称)	<i>Olibrinus</i> Budde-Lund, 1913
ホソヒゲナガワラジムシ(新称)	<i>Olibrinus elongatus</i> , n. sp.

The study of the terrestrial isopod crustaceans in Japan has so far been much ignored. *Ligidium japonicum* described by Verhoeff (1918) from Hokkaido was the first record for Japan. A relatively large contribution made by Arcangeli (1927), based on collection of Dr. Silvestri, included the descriptions of 12 species of which six were new to science.

This was then followed by Iwamoto (1943) who described 12 species including six new species, while Vandel (1968~1970) described four species mostly from caves. In recent years, I added three new species to the Japanese terrestrial isopod fauna.

Thus, up to the present time, about forty species belonging to the suborder Oniscoidea having been reported; however, they seem in all probability to represent only a portion of the total fauna. Delay in the taxonomical study of the group is even more evident in comparison with the ecology and physiology of this group which rapidly progressed in recent years. Since 1974, I have tried to gather the specimens from various parts in Japan, and moreover many specimens were sent to me for my study or for identification by my friends. In this way, about ten thousands of specimens were gathered at my disposal. Further, I examined some specimens deposited at the Osaka Museum of Natural History and the National Science Museum, Tokyo for the purpose of comparison and redescription.

The present paper is intended to summarize my study on the Japanese Oniscoidea and as the first step, the species of the Families Ligiidae, Trichoniscidae and Olibrinidae are herein treated, recording 19 species of which 8 are revealed to be new to science.

The specimens, mostly preserved in 70% alcohol, were examined in glycerol under microscope with the magnification ranging 10x to 600x.

All the figures were drawn by using camera lucida or shadowgraph.

Family Ligiidae BRANDT, 1833

(Jap. name : Funamushi-ka)

Body oval. Second antenna with a rudiment of exopodite ; flagellum consisting of large number of articles. Palp of maxilliped 5-segmented. Penes double. Only second pleopod in male suitable for copulation. Eyes large, composed of large number of ocelli. Pleopods without pseudotracheae.

This family is very common on the sea-shore and in the forest in Japan.

Key to the genera of the Family Ligiidae.

- 1 Body large, up to 58 mm. Flagellum of second antenna composed of more than 20 segments. Eyes large with more than 500 ocelli. Uropoda with basal part not protruded in a process at the inner distal angle ; branches equal in length. Last segment of pleon large, with lateral part well developed. Genus *Ligia* FABRICIUS, 1798
- 1' Body small, up to 12 mm. Flagellum of second antenna composed of less than 20 segments. Eyes composed of less than 20 ocelli. Uropoda with basal article protruded in a process at the inner distal angle ; branches unequal in length. Last segment of pleon small, with lateral part obsolete. Genus *Ligidium* BRANDT, 1833

Genus *Ligia* FABRICIUS, 1798

(Jap. name : Funamushi-zoku)

Body oval, pleon not abruptly contracted. First antenna very small, with the last segment rudimentary. Second antenna developed, and with multi-segmented flagellum. Eyes big with usually more than 500 ocelli. Uropod elongated and styliform ; basal part not protruded inwards.

Key to the Japanese species of the Genus *Ligia*.

- 1 Second antenna very long and usually exceeds the peraeon in male ; flagellum composed of more than 28 segments. 2
- 1' Second antenna usually shorter than the peraeon in male ; flagellum composed of less than 27 segment. 3
- 2 With process on propodus of male first peraeopod. *L. exotica* ROUX, 1798
- 2' Without process on propodus of male first peraeopod. *L. ryukyuensis*, n. sp.
- 3 With process on propodus of male first peraeopod. *L. cinerascens* BUDDE-LUND, 1885
- 3' Without process on propodus of male first pleopod. *L. boninensis* NUNOMURA, 1979

***Ligia exotica* ROUX, 1828**

(Jap. name : Funamushi)

Fig. 1

Ligia exotica Roux, 1828 ; ———, Budde-Lund, 1885 ; ———, Dollfus, 1893 ; ———, Richardson, 1899 ; ———, Richardoson, 1900 ; ———, Richardson, 1905 ; ———, Jackson, 1922 ; ———, Arcangeli, 1927 ; ———, Shiino, 1965.

Ligia grandis Perty, 1830.

Ligia grandichaudii Milne-Edwards, 1840.

Ligia italica coriacea Koch, 1835-1844.

Material examined: More than 500 specimens from various localities extending from Aomori Pref. to Tanegashima Island.

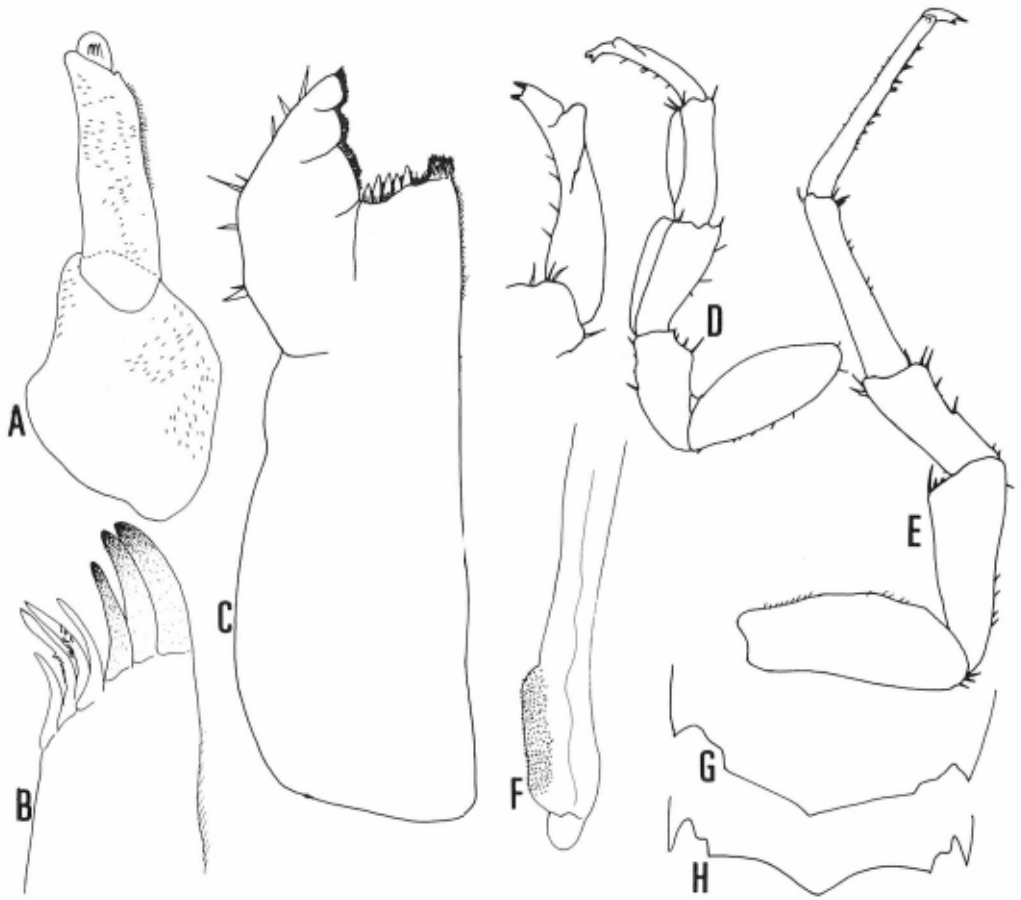


Fig. 1. *Ligia exotica* ROUX, 1828

A. First antenna ; B. Tip of endite of first maxilla ; C. Maxilliped ; D. Male first peraeopod ; E. Male seventh peraeopod ; F. Tip of stylus of male second pleopod ; G. Posterior part of pleotelson of the male specimen from Tanegashima Island, Kagoshima Pref. ; H. The same of the specimen from wakayama Prefecture (A-D: Male specimen from Kyoto Prefecture, E and G: Male specimen from Tanegashima, H: Male specimen from Wakayama Prefecture).

Description: Body narrower, 2.2 times as long as wide. Body size 58 mm including uropod but excluding antennae. Body colour olive-brown. Epimera distinctly separated. Body surface with many minute granules. Telson with an acute lateral process on each side. Apex sharply pointed. Eyes big and reniform, each with about 700 ocelli.

First antenna vestigial and composed of 3 segments; first segment quadrate; second segment oblong and with many hairs on the border; terminal segment small and rounded with 4 sensory setae.

Second antenna very long and extending beyond the telson. Peduncle 5-segmented; basal 3 segments short; fourth segment long; fifth segment long. Flagellum composed of 28~48 segments.

Right mandible; pars incisiva composed of 2 strong teeth; lacina mobilis not chitinized, with 2 teeth, one of which is larger and with 2 serrated teeth at the tip and the other is smaller with 3 serrated teeth at the tip. About 23 hairy setae between lacina mobilis and processus molaris; processus molaris well developed.

Left mandible; pars incisiva composed of 3 strong teeth; lacina mobilis chitinized with 3 setae; about 20 setae between lacina mobilis and processus molaris; processus molaris well developed.

First maxilla (Fig. 1B) rather long; inner lobe with 3 hairy denticles; outer lobe with 3 larger and 4 thinner teeth, the latter bears small denticles on its inner margin. Second maxilla well developed.

Maxilliped (Fig. 1C); endopodite truncate in the apical part and with 2 hairy stout setae and 5 sharp teeth; palp imperfectly 5-segmented.

Male first pereopod with merus and carpus both ventrally equipped with a soft cushion-like expansion. Strongly developed on the distal part of propodus, though not conspicuous in some male specimens.

Penes rather long and almost but gradually tapering towards the tip. Stylus on male second pleopod (Fig. 1F) long, with the tip distinctly swollen and scattered by many small denticles.

Uropod long; basis about 5.5 times as long as wide with a sharp spine at outer distal margin; exopodite long and 1.7 times as long as the basis; endopodite longer than the exopodite and about twice as long as basis.

Ligia cinerascens BUDDE-LUND, 1885

(Jap. name: Kita-funamushi, new)

Fig. 2

Ligia cinerascens Budde-Lund, 1885; ———, Gurjanova, 1933; ———, Gurjanova, 1936; ———, Kussakin, 1956; ———, Kussakin, 1974; ———, Mokiebskii, 1960; ———, van Name, 1936.
Lygida cinerascens Richardson, 1909.

Material examined: 4♂♂ 6♀♀, Erimo-misaki Cape, Erimo-chō, Horoizumi-gun, Hokkaido, coll. Tsatsunori Itō, July 15, 1975; 5♂♂ 6♀♀, Usu-mura, Usu-gun, Hokkaido, coll. Shigeru Nakao, Aug. 1, 1976; 3♂♂ 10♀♀, Kamoenai-mura, Furuu-gun, Hokkaido, coll. Shigeru Nakao, Jul. 1976; 1♂, Usujiri, Minami-kayabe-chō, Kayabe-gun, Hokkaido, coll. Wataru Nunomura, 1980; 15♂♂ 3♀♀, Kamiisu-chō, Kamiiso-gun, Hokkaido, coll. Shigeru Nakao, July 1, 1976; 1♀ Oshoro, Otaru City, Hokkaido, coll. Noboru Nunomura, July 16, 1982; many specimens, Pon-Oshoro, Otaru City, Hokkaido, coll. Hiroshi Hoshikawa, June 18, 1982.

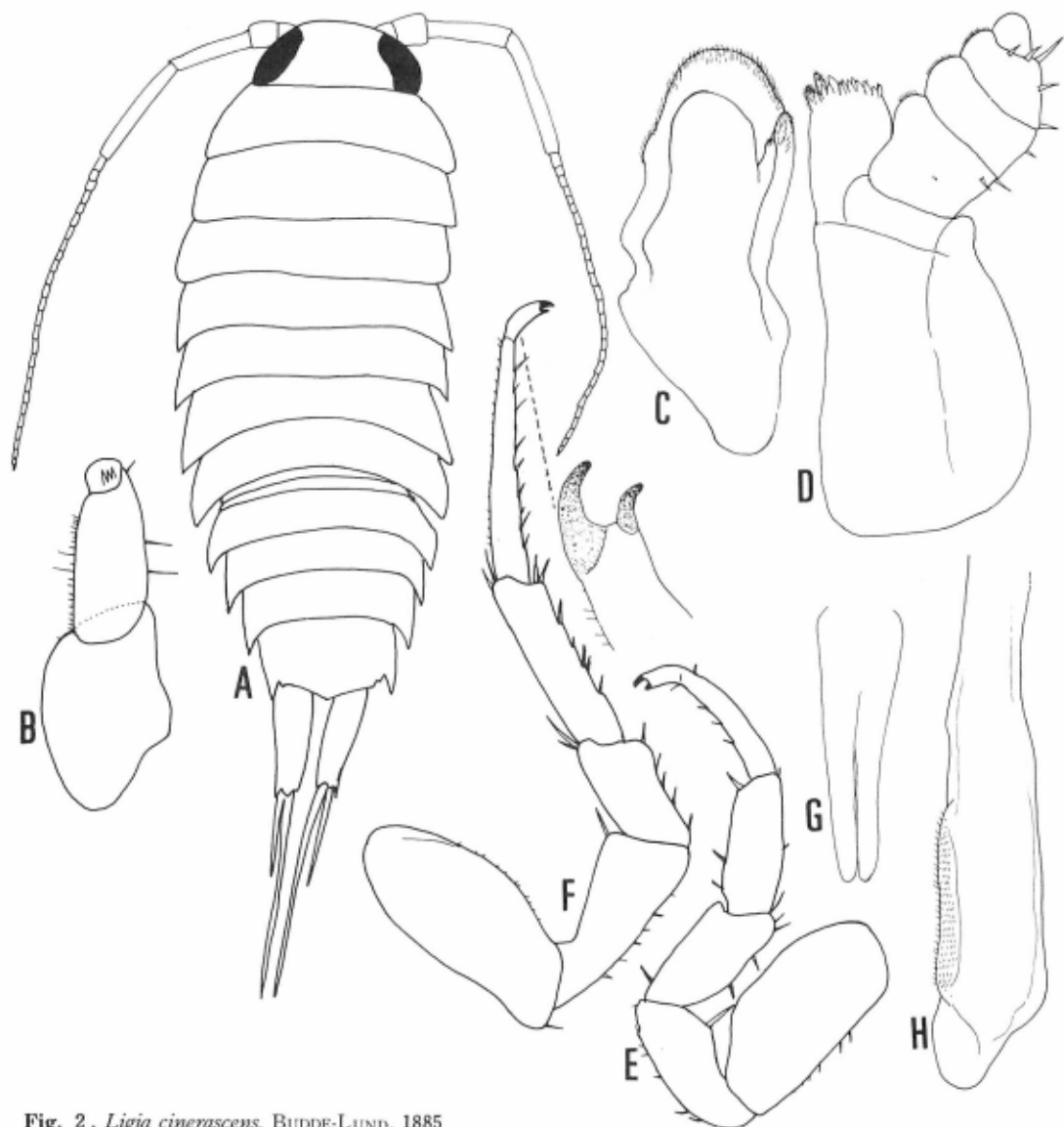


Fig. 2. *Ligia cinerascens*, BUDDE-LUND, 1885

A. Dorsal view; B. First antenna; C. Second maxilla; D. Maxilliped; E. Male first peraeopod; F. Male seventh peraeopod; G. Penes; H. Stylus of male second pleopod (All: from Usu, Hokkaido).

Description : Body oval and rather wide, 2.2 times as long as wide, 55 mm long including uropods, but excluding antennae. Each pereopodal segment almost equal in length. Body colour dark brown in living and in alcohol. Body surface pretty smooth, but with minute granules sparsely on the dorsal surface. First and second pleopodal somites almost equal in length. Third to fifth pleopodal somites also similar in length, and each with acute lateral border.

Eyes large and reniform, and each with about 700 ocelli.

First antenna (Fig.2B) vestigial and composed of 3 segments; first segment subquadrate; second segment oblong; terminal segment small with 3 teeth-like structures in the middle part.

Second antenna rather short in the genus *Ligia*, reaching to the posterior part of the last pereopodal somite. Peduncle 5-segmented; the basal 3 segments short; fourth segment pretty long, about 4 times as long as wide; fifth segment long, about 8 times as long as wide. Flagellum composed of 22~27 segments.

Right mandible; pars incisiva composed of 3 large teeth; lacina mobilis not chitinized, with 3 serrated teeth; about 17 hairy bristles between lacina mobilis and processus molaris; processus molaris with a tuft of hairs.

Left mandible; pars incisiva composed of 2 strong teeth; lacina mobilis chitinized with 4 teeth; 9 hairy setae between lacina mobilis and processus molaris.

First maxilla rather long; inner lobe with 3 hairy bristles on the distal margin; outer lobe with 3 larger and 8 smaller teeth at the tip. Second maxilla (Fig. 2C) broad and divided into 2 lappets.

Maxilliped (Fig.2D) broad. Palp 5-segmented and each segment is perfect; first segment short; second almost square and with a tuft of hair at inner distal corner; third segment short with a seta and a tuft of hairs; fourth segment short and with 3 setae on distal margin; terminal segment small and round. Endopodite extending beyond the posterior border of second palpal segment, with a plumose and about 11 simple setae at the tip.

All the pereopods almost similar in shape; basis oblong with several small setae; ischium rectangular with a seta on outer margin; merus rectangular with several setae on inner margin; carpus rectangular, with cushion-like structure in male first pereopod; propodus long, with a small protuberance in the first pereopod of male.

Penes (Fig. 2G) rather slender. Male second pleopod (Fig. 2H) with the tip flattened, bearing many small denticles.

Uropod long; basis with 4 to 5 spines on inner margin; exopodite about a little shorter than the basis; endopodite about twice as long as the exopodite. Telson with rather obtuse medial end but with acute triangular protuberances on both margins.

Remarks : This species resembles to *Ligia exotica* Roux which is distributed from Honshu to Kyushu, but the former is separated from the latter in the following features: (1) shorter and less numerous segmentation in second antenna, (2) distinct segmentation in palp

of maxilliped, (3) endopod of second maxilla which bears some hairs, and (4) hindo-medial part of telson protruded obtusely.

Ligia ryukyuensis, n. sp.

(Jap. name : Ryukyu-hunamushi, new)

Figs. 4 and 5

Material examined : 1♂ (holotype, 19.0 mm in body length) and 6♀♀ (1♀ allotype, 24.1 mm in body length and 5♀♀ paratypes, 18.0~34.0 mm in body length), Sarahama-beach, Irabu-son, Irabu Island, Miyako Islands, Okinawa Pref., coll. Noboru Nunomura, June 30, 1975 ; 1♂ 2♀♀, Karimata, Hirara City, Miyako Island, Okinawa Pref., coll. Noboru Nunomura, June 21, 1975 ; 1♀, Port of Tokashiki, Tokashiki Island, Tokashiki-son, Shimajiri-gun, Okinawa Pref., coll. Yasuhiro Nakajima Aug. 19, 1975 ; 1♂ 3♀♀, Shiromata, China-chô, Okinoerabu Island, Ousima-gun, Kagoshima Pref., coll. Noboru Nunomura, July 1, 1974 ; 2♀♀, Sumiyoshi, Iriomote Island, Yaeyama Islands, Okinawa Pref., coll. Noboru Nunomura, June 21, 1975 ; 1♂ 5♀♀, Naminoue, Naha City, Okinawa Pref., coll. Noboru Nunomura, June 19, 1975 ; 2♂♂ 4♀♀, Hyakuna-beach, Tamagusuku-son, Shimajiri-gun, Okinawa Island, Okinawa Pref., coll. Yasuo Fukui and Yasuhiro Nakajima, Mar. 29, 1975 ; 8♀♀, Sonai, Iriomote Island, Yaeyama Island, Okinawa Pref., coll. Noboru Nunomura, June 21, 1975 ; 1♀, Chiji-zaki, Yoron Island, Ousima-gun, Kagoshima Pref., coll. Yasuhiro Nakajima, Apr. 29, 1976 ; 1♂, Oujima, Tamagusuku-son, Shimajiri-gun, Okinawa Island, Okinawa Pref., coll. Noboru Nunomura, July 4, 1975 ; 1♂ 2♀♀, China-zaki, Chinen-son, Shimajiri-gun, Okinawa Island, Okinawa Pref., coll. Hiroshi Hoshikawa, 1980 ; 2♂♂ 4♀♀, sea-road of Katsuren-Henza, Yonagusuku-son, Nakagami-gun, Okinawa Island, Okinawa Pref., coll. Hiroshi Ueda, June 24, 1982 ; 4♂♂ 2♀♀, Oohara, Iriomote Island, Yaeyama Islands, Okinawa Pref., coll. Noboru Nunomura, Mar. 23, 1977 ; 1♂ 2♀♀, Uotsuri-Island, Senkaku Islands, Ishigaki City, Okinawa Pref., coll. Takuya, Abe, Mar. 11, 1979.

Type specimens are deposited at the Toyama Science Museum : holotype (TOYA-Cr-541), allotype (TOYA-Cr-542) and 4 paratypes (TOYA-Cr-543~546).

Description : Body length reaches 34mm. Body surface smooth, yellowish brown in alcohol with dark irregular patterns on the dorsal surface. Eyes large and reniform, each with about 600 ocelli. Body rather slender about 4 times as long as wide including uropods but excluding second antennae.

First antenna vestigial and composed of 3 segments ; first segment subquadrate ; second segment oblong with a group of setae on distal terminal part and with many short bar-like patterns on the surface ; terminal segment small and rounded with 5 sensory setae.

Second antenna very long, reaching the pleotelson. Peduncle 5-segmented ; basal 3 segments relatively short ; fourth segment nearly 7 times as long as wide ; fifth segment longer than the fourth and 10 times as long as wide. Flagellum very long and composed 32~38 segments.

Right mandible (Fig. 3D) stout ; pars incisiva composed of 2 teeth ; lacina mobilis not chitinized with 6 teeth, about 14 hairy bristles between lacina mobilis and processus molaris.

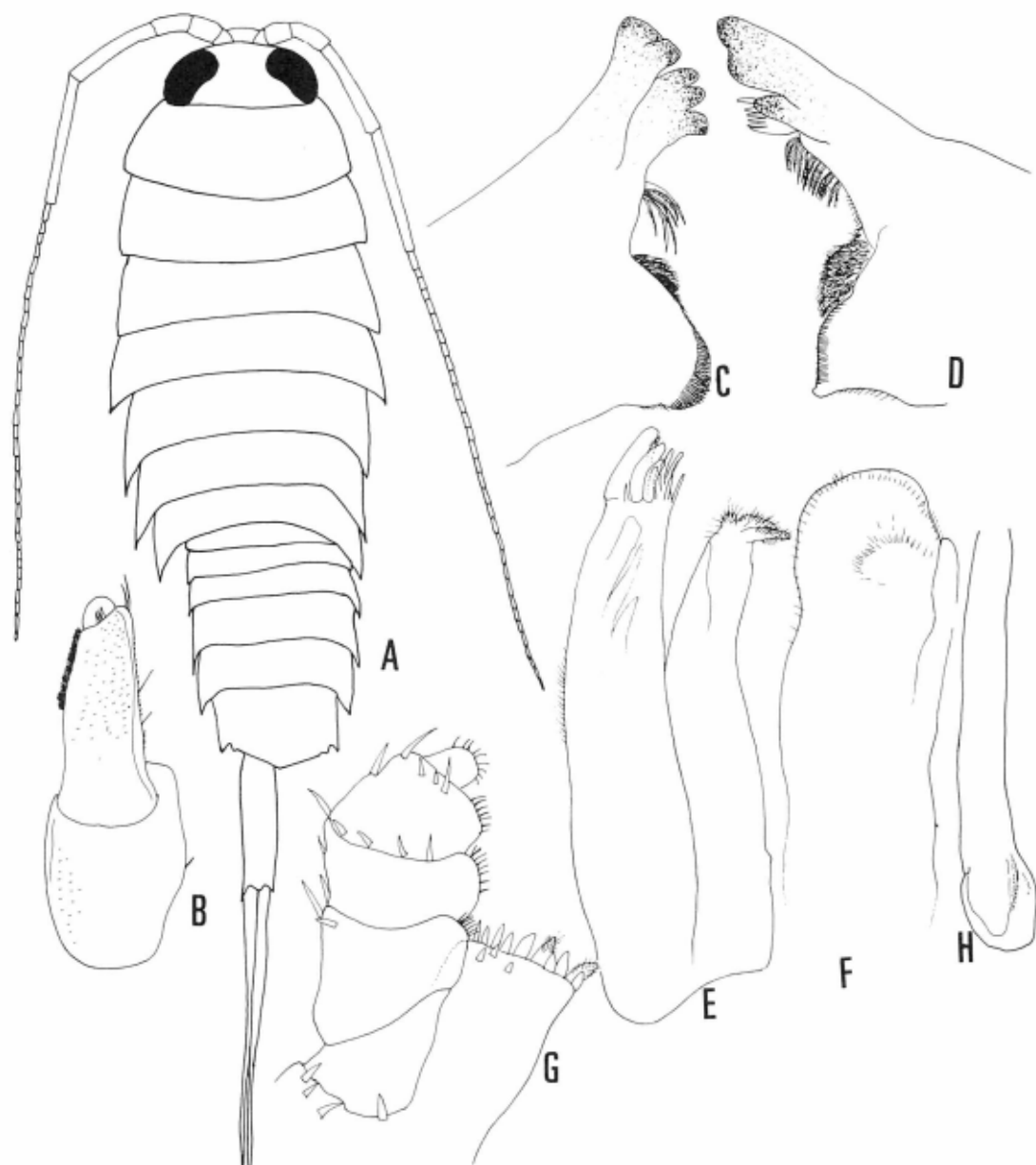


Fig. 3. *Ligia ryukyuensis*, n. sp.

A. Dorsal view; B. First antenna ; C. Left mandible ; D. Right mandible ; E. First maxilla ; F. Second maxilla ; G. Apical part of maxilliped ; H. Stylus of male second pleopod (A-D : Paratype, E · F and H : Holotype male, G : Allotype female).

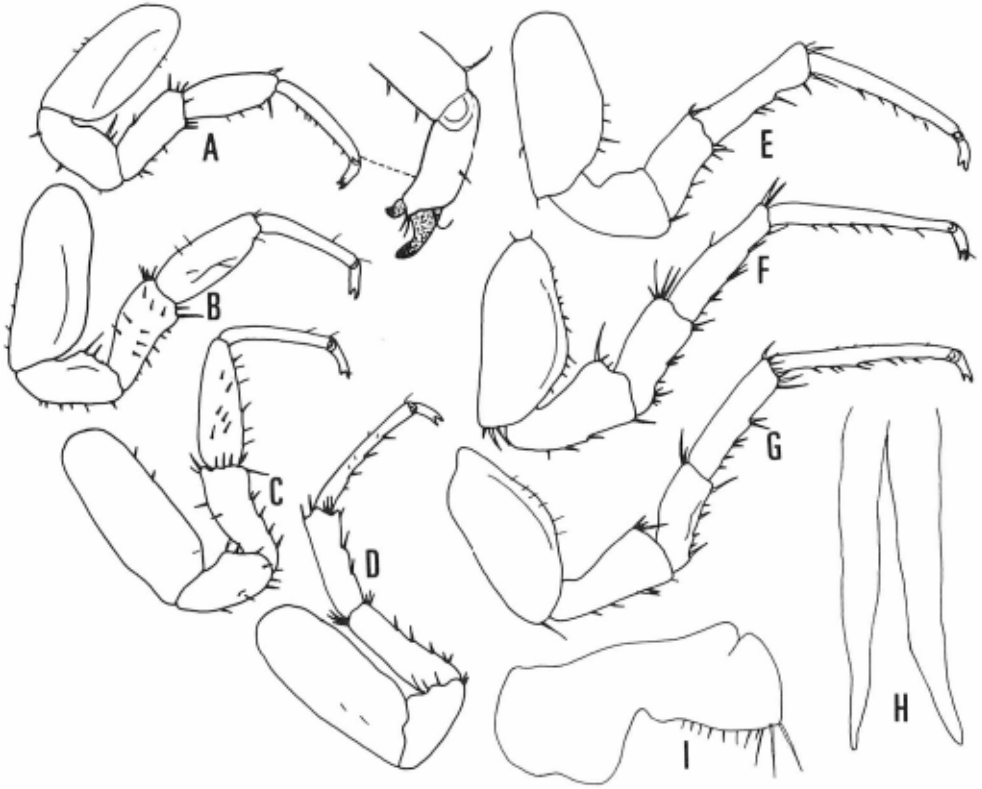


Fig. 4. *Ligia ryukyuensis*, n. sp.

A-G. First to seventh pereopods; H. Penes; I. Basis of male first pleopod (All: Holotype male).

Left mandible (Fig. 3C) also stout; pars incisiva composed of 2 stout teeth; lacina mobilis composed of 3 strong teeth; about 6 hairy bristles between lacina mobilis and processus molaris; processus molaris relatively small.

First maxilla (Fig. 3E) rather stout; outer lobe with 2 longer hairy bristles and 1 shorter hairy bristle at the tip; inner lobe with 3 stout teeth, 3 slender teeth and 4 short teeth at the tip.

Second maxilla (Fig. 3F) broad and weakly divided into 2 lappets.

Maxilliped (Fig. 3G) broad; palp 5-segmented and each border is perfect; fourth segment with many setae; tip of endopodite with about 13 setae on distal margin.

First pereopod not specialized in both sexes; basis rectangular; ischium rectangular with a few of setae on inner margin and 2 relatively long setae on outer margin; merus rectangular with several setae on inner margin and bistal border; carpus rectangular and with some setae on inner margin and a stout seta at outer distal corner, without cushion-like structure; propodus oblong with several small setae on inner margin and without any protuberance in both sexes; dactylus bifid, outer claw much larger than the inner one.

Second to third peraeopods (Fig. 4B-C) similar in shape; basis oblong; ischium triangular with several setae on inner margin; merus elongated triangular with many setae on both inner margin and distal margin; carpus rectangular with many setae in third peraeopod but few in the second peraeopod; propodus long.

Fourth to seventh peraeopods (Fig. 4D-G) similar in shape; basis stout with some setae; ischium elongated triangular; merus rectangular with several setae on inner margin; carpus rectangular with several setae on inner margin and some setae on distal border; propodus very long with many setae on inner margin.

Penes (Fig. 4H) slender and tapering towards the tip. Stylus on male second pleopod (Fig. 3H) with a rounded tip and a thin suture with many hairs. Third to fifth pleopods similar in shape; endopodite trapezoid; exopodite dumbbell-shaped with 10~12 sharp setae on postero-lateral part. Uropod long; basis with 3 small setae on inner margin and a spine on outer distal margin; exopodite long about twice as long as basis; endopodite a little shorter than the exopodite; posterior margin of telson triangular in medial part with acute baymouths on both hind-lateral margins.

Remarks: The present new species resembles most closely *Ligia cinerascens* BUDDÉ-LUND from Hokkaido and Kuril Island, but the former is different from the latter in the following features: (1) much longer second antennae with more numerous flagellar segments, (2) longer uropod, (3) longer penes and so on. The present new species is closely allied to *Ligia exotica* ROUX from Honshu, Shikoku and Kyushu, but differs from the latter in the following features: (1) smaller and slenderer body, (2) longer second antennae with more numerous flagellar segments, (3) longer uropod, (4) absence of protuberance and cushion-like structure on male first peraeopod, and (5) smoother body surface.

***Ligia boninensis* NUNOMURA, 1979**

(Jap. name: Ogasawara-funamushi)

Fig. 6

Ligia boninensis NUNOMURA, 1979.

Material examined: 1♂ 2♀♀, mountain path of Oki-mura, Haha-jima, Bonin Island, coll. Tatsunori Ito, Apr. 12, 1973.

Description: Body surface rather smooth but with minute granules very sparsely all over. Body colour brown in alcohol. Eyes big and reniform with more than 600 ocelli.

First antenna vestigial and composed of 3 segments stout with 2 setae and many hairs; second segment oblong with many hairs; terminal segment small and semicircular. Second antenna (Fig. 5B) longer than the peraeonal somites; anterior 3 segments short and rectangular; fourth and fifth segments long with many small spines; flagellum with 22 segments.

Right mandible stout; pars incisiva composed of one strong tooth; lacina mobilis slender, not chitinized and with 4 teeth at the tip; 10 hairy bristles between lacina mobilis and processus molaris. Left mandible stout; pars incisiva composed of 2 teeth; lacina mobilis chitinized

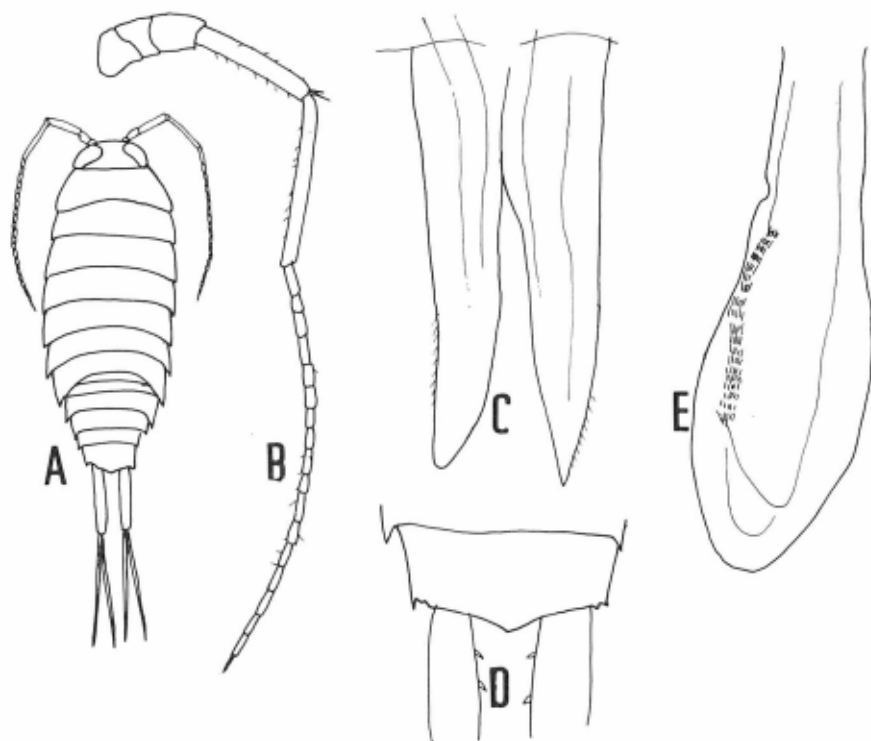


Fig. 5 *Ligia boninensis*, NUNOMURA, 1979

A. Dorsal view; B. Second antenna; C. Penes; D. Telson; E. Stylus of male second pleopod (A: Holotype male, B-E: Allotype male).

with 3 heads; about 7 hairy bristles between lacina mobilis and processus molaris. First maxilla with 2 lobes; outer lobe with about 6 recurved teeth and 2 or 3 recurved teeth bearing small spines; inner lobe with 3 hairy bristles. Second maxilla divided into 2 lappets. Maxilliped with 5-segmented palp; each segment demarcated conspicuously; endite extending beyond the distal end of third segment but not reaching the fourth segment and with many hairs and 9 to 10 stout but short spines at the tip; exopodite small.

All the pereopods are rather similar in shape in both sexes, but the size gradually increases from the anterior pair to the posterior one; basis oblong with 2 to a dozen setae; ischium oblong with a relatively big seta at outer corner; merus oblong with 4 to 10 setae at inner margin; carpus also oblong with 5 to 8 setae on inner margin and 1 or 2 setae at outer distal corner; propodus long with 3 to 6 setae on inner margin; dactylus with a bifid claw; first pereopod in male without comb or process on propodus.

Penes (Fig. 5C) mediocre; apex weakly setose. Second pleopod in male (Fig. 5E) are modified; stylus long, apical part swollen with about 6 rows of 25 spinules. Uropod with 3

spines on inner margin and many little spines on outer margin of basis; both lami long but exopodite somewhat shorter than the endopodite. Posterior margin of telson (Fig.5D) triangulate with blunt median process and rather sharp accessory process.

Remarks: This species is most closely allied to *Ligia perkinsi* (DOLLFUS) from Hawaii, but differs from *perkinsi* in the following features: (1) less numerous flagellar segments of the second antenna, (2) shape of the first antenna, (3) shorter uropod, and (4) more bluntly posterolateral process of telson.

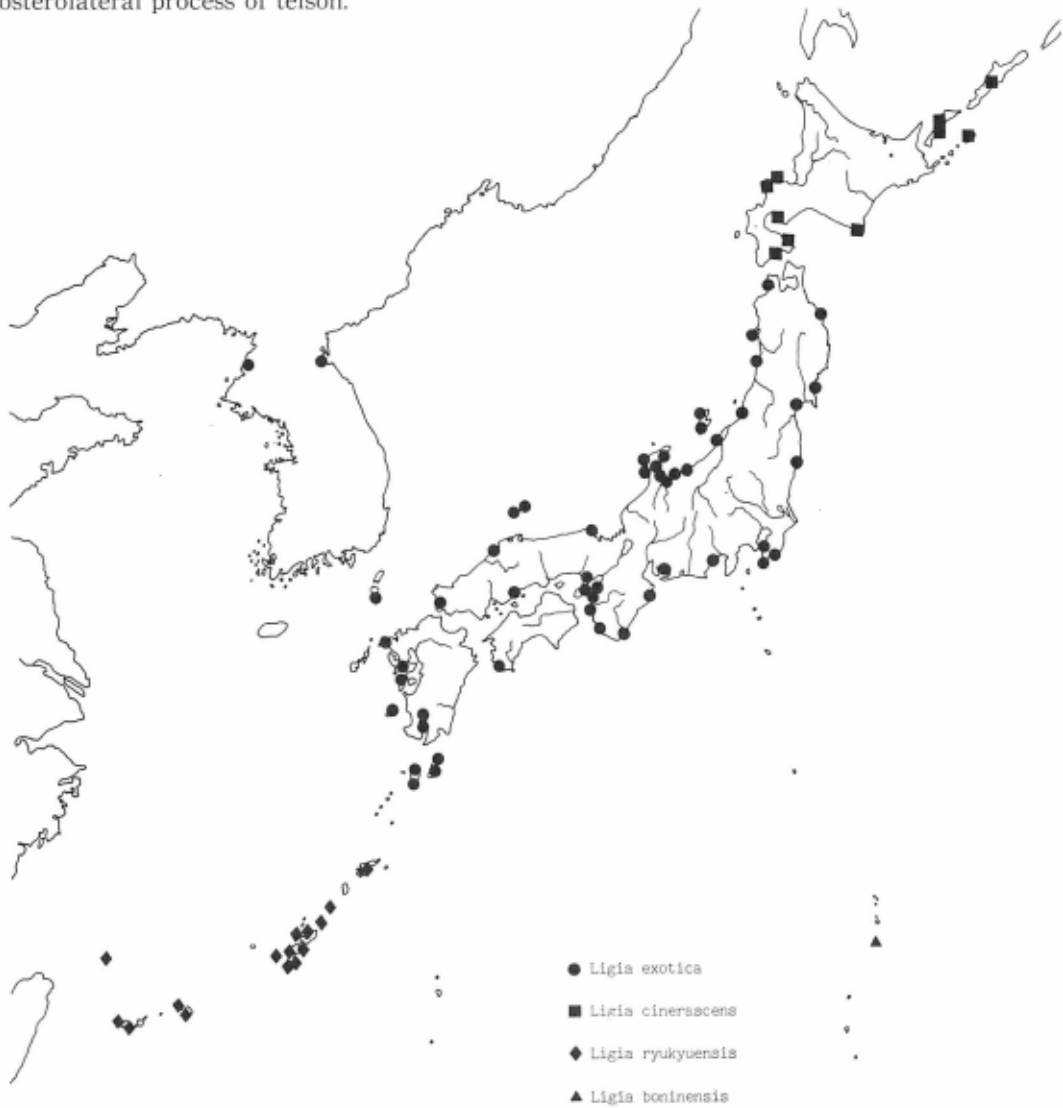


Fig. 6. Map showing the geographical distributions of the genus *Ligia*. The date include a few records written by some scientists.

Genus *Ligidium* BRANDT, 1833
(Jap. name ; Hime-funamushi-zoku)

Body oblong and rather convex. Cephalon evenly rounded in front. Lateral part of pleon less prominent than in *Ligia*. Second maxilla is divided into 2 lappets. The uropods with basal part protruded at inner rear angle ; endopodite longer than the exopodite.

Key to the Japanese species of the Genus *Ligidium*

- 1 Body larger, usually exceeding 6 mm in length. Second antenna long ; flagellum composed of more than 10 segments. The first peraeonal somite without a group on hind lateral part. Eyes big..... 2
- 1' Body smaller, not exceeding 6 mm in length. Second antenna short ; flagellum composed of less than 10 segments. The first peraeonal somite with a group of bristles on hind lateral part. Eyes small..... 4
- 2 Stylus on male second pleopod ends in a lappet-like structure.....
L.japonicum VERHOEFF, 1918
- 2' Stylus on male second pleopod tapers towards the tip..... 3
- 3 Stylus on male second pleopod with a beak-shaped tooth near the tip.....
L.koreanum FLASAROVA, 1972
- 3' Stylus on male second pleopod without a beak-shaped tooth, but with a trapezoidal structure.....*L.ryukyuense*, n. sp.
- 4 Stylus on male second pleopod with 3 to 10 denticles on posterior part..... 5
- 4' Stylus on male second pleopod without denticle.....*L.kiyosumiense*, n. sp.
- 5 Body slender, more than 3.5 times as long as wide. Stylus on male second pleopod with 3 denticles.....*L.iyoense*, n. sp.
- 5' Body rather short, less than 2.9 times as long as wide. Stylus on male second pleopod with 10 denticles..... *L. paulum* NUNOMURA, 1976

***Ligidium japonicum* VERHOEFF, 1918**

(Jap. name : Nihon-himefunamushi, new)

Fig. 7.

Ligidium japonicum Verhoeff, 1918 ; ———, Jackson, 1923 ; ———, Iwamoto, 1943 ; ———, Shiino 1965.

Material examined : More than 600 specimens from various localities from Hokkaido to Shikoku.

Description : Body 7 mm in length, convex and oblong ovoid about 2.6 times as long as wide. Colour of dorsal surface brown with dark brown patterns. Body surface smooth and shining. Dark transverse patterns between eyes but sometimes lacking. First peraeonal somite without a group of bristles on hind-lateral border. Eyes big, each with 60 ocelli.

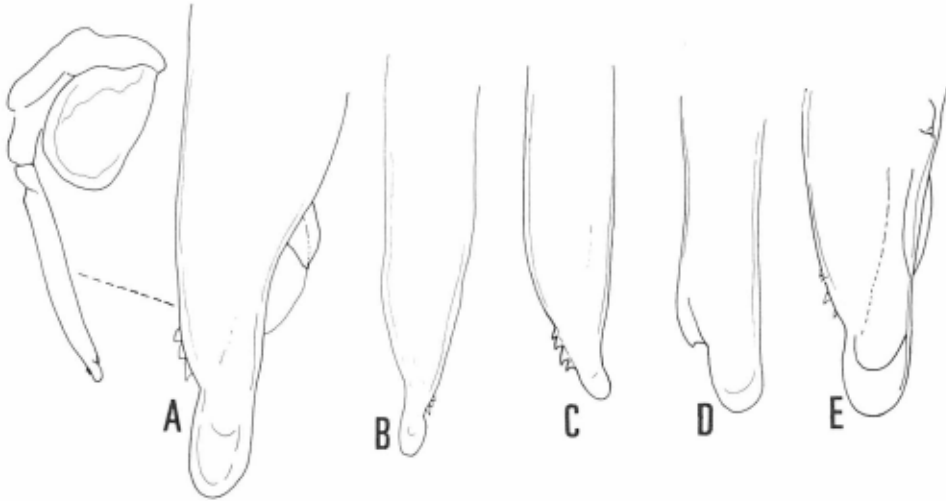


Fig. 7. *Ligidium japonicum* VERHOEFF, 1918

A-E show the variation of shape of stylus of male second pleopod from several localities. (A. Specimen from Aomori Pref., B. Specimen from Ibaragi Pref., C. Specimen from Toyama Pref., D. Specimen from Kyoto Pref., E. Specimen from Hokkaido, redrawn from Flasarova).

First antenna small and composed of 3 segments; first segment subquadrate with 2 big setae at distal corner; second segment with 3 stout setae; terminal segment small with a projection.

Second antenna reaching as far back as the anterior part of third peraeonal somite; flagellum composed of 12 ~ 16 segments.

Right mandible; pars incisiva composed of 3 strong teeth; lacina mobilis with 3 teeth, not chitinized; 2 hairy setae between lacina mobilis and processus molaris. Left mandible; pars incisiva composed of a strong tooth; lacina mobilis chitinized with 3 teeth; 5~6 hairy setae between lacina mobilis and processus molaris well developed. First maxilla; inner lobe with 3 stout teeth and 2~3 ordinary setae at the tip; outer lobe with 3 hairy bristles at the tip. Second maxilla divided into 2 lappets and each stout with 2 hairy bristles. Maxilliped; endopodite with a hairy bristle and 3 setae at the tip; palp 5-segmented.

Penes short. Endopodite of male first pleopod roundly triangular and bears several setae at the tip. Endopodite of male first pleopod triangular but concave on the oblique side. Tip of stylus on male second pleopod ends in a lappet and with a big and some small denticles, but some specimens show different types (Fig. 7).

Remarks: The shape of stylus on male second pleopod is the most important character; but certain specimens, mainly from western Honshu, show some different types, distinct from those from the type locality, and some of them resemble rather the specimens of *L. koreanum*, which is distributed in Korea and Kyushu.

Ligidium koreanum FLASAROVA, 1972

(Jap. name : Chōsen-himefunamushi, new)

Fig. 8

Ligidium koreanum Flasarova, 1972.

Material examined : More than 120 specimens from various localities in Kyushu, Western Japan.

Description : Body 12 mm in length. Body colour brown or pale brown with a pair of longitudinal darker lines. surface smooth and shining. Eyes big with 70~80 ocelli.

First antenna small and composed of 3 segments; first segment subquadrate with a big seta at distal corner; second segment rectangular; 2 long and a short setae on distal mar-

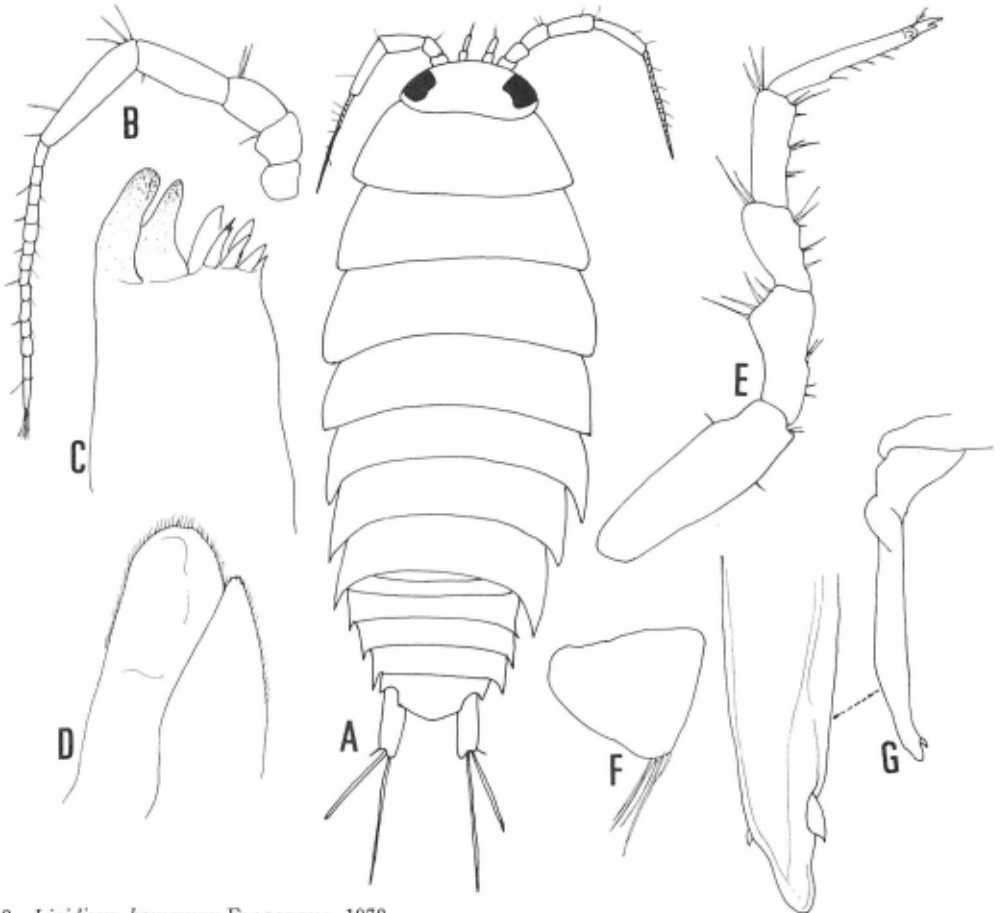


Fig. 8. *Ligidium koreanum* FLASAROVA, 1972

A. Dorsal view; B. Second antenna; C. Apical part of first maxilla; D. Second maxilla; E. Male seventh pereopod; F. Exopod of male first pleopod; G. Stylus of male second pleopod. (All: Male specimens from Tsushima Island, Nagasaki Pref.).

gin; terminal segment much reduced and with 2~3 aesthetascs at the tip.

Second antenna (Fig. 8B) long. Peduncle 5-segmented; first segment subquadrate; second segment square in shape with a seta; third segment rectangular with 2 setae; fourth and fifth segments oblong with some setae. Flagellum consists of 13~17 segments; terminal segment with a tuft of setae.

Right mandible; pars incisiva composed of 3 strong teeth; lacina mobilis not chitinized, with 4 serrated teeth; 2~4 hairy setae between lacina mobilis and processus molaris, processus molaris well developed. Left mandible; pars incisiva composed of 2 teeth; lacina mobilis composed of 4 teeth; 6 hairy setae between lacina mobilis and processus molaris; processus molaris well developed. First maxilla with 2 lobes; outer lobe with 10~11 teeth at the tip; inner lobe with 3 hairy bristles at the tip. Second maxilla imperfectly divided into 2 lappets and with rounded apex. Maxilliped; epipodite elongated on the coxa; endopodite truncated at the anterior border, where it bears about 9 small bundles of short setae; palp 5-segmented, and each bears a cluster of bristles at inner distal corner.

First peraeonal somite without bristle on hind-lateral corner. Peraeopods are all similar in shape.

Endopodite of male first pleopod (Fig. 8F) triangular with 5 setae at the tip. Stylus of male second pleopod (Fig. 8G) with a strong beak-shaped tooth and some small denticles near the tip.

Ligidium ryukyuense, n. sp.

(Jap. name: Ryukyu-himefunamushi, new)

Figs. 9 and 10

Material examined: 1♂ (holotype, 9.0 mm in body length) and 6♀♀ (1♀ allotype, 10.4 mm in body length and 5♀♀ 7.2~12.3 mm in body length, Sumiyō-river, Yamato-son, Amami-oshima, Oshima-gun, Kagoshima Pref., coll. Takuya Abe, Dec. 18, 1975, 3♂♂ 4♀♀, Mt. Yuwan-dake, Uken-son, Oshima-gun, Amami-oshima, Pref., coll. Yasuhiko Shibata, June 27, 1970; 2♀♀, Mt. Nishime-dake, Kunigami-son, Kunigami-gun, Okinawa Island, Okinawa Pref., coll. Yasushi Azama, June 1973; 2♀♀, Okuma, Kunigami-son, Kunigami-gun, Okinawa Island, Okinawa Pref., coll. Hiroshi Hoshikawa, June 21, 1980; 2♂♂ 2♀♀, Mt. Omoto-dake, Ishigaki City, Ishigaki Island, Yaeyama Islands, Okinawa Pref., coll. Takuya Abe, Dec. 4, 1977. Type specimens are deposited at the Toyama Science Museum: holotype (TOYA-Cr-1891), allotype (TOYA-Cr-1892) and 5 paratypes (TOYA-Cr-1893~1897).

Description: Body reaches 12.3 mm in length, about 3.2 times as long as wide. Body surface pale brown with a pair of dark brown lines, but almost dark brown in some specimens. Eyes rather large, each with about 150 ocelli. Posterolateral part of first peraeonal somite without a group of bristles.

First antenna (Fig. 9B) composed of 3 segments; first segments almost square and with a long seta at distal corner; second segment oblong with 3 setae at distal end; terminal

segment is almost vestigial with 3 small setae at the tip. Second antenna (Fig. 9C) pretty long, reaching to the third peraeonal somite, and composed of 13~15 segments.

Right mandible (Fig. 10B) rather stout; pars incisiva composed of 2 strong teeth; lacina mobilis not chitinized and with 5 setae at the tip; 2 hairy setae between lacina mobilis and processus molaris. Left mandible (Fig. 10A) also pretty stout; pars incisiva composed of 2 strong teeth; lacina mobilis chitinized with 3 teeth and 1 hairy setae near the lacina mobilis. First maxilla (Fig. 10C) pretty stout; inner lobe with 8~10 teeth at the tip; outer lobe with 3 stout hairy bristles at the tip. Second maxilla (Fig. 10D) weakly bilobed with 2 hairy bristles. Maxilliped (Fig. 10E) with an elongated epipodite on the coxa; endopodite

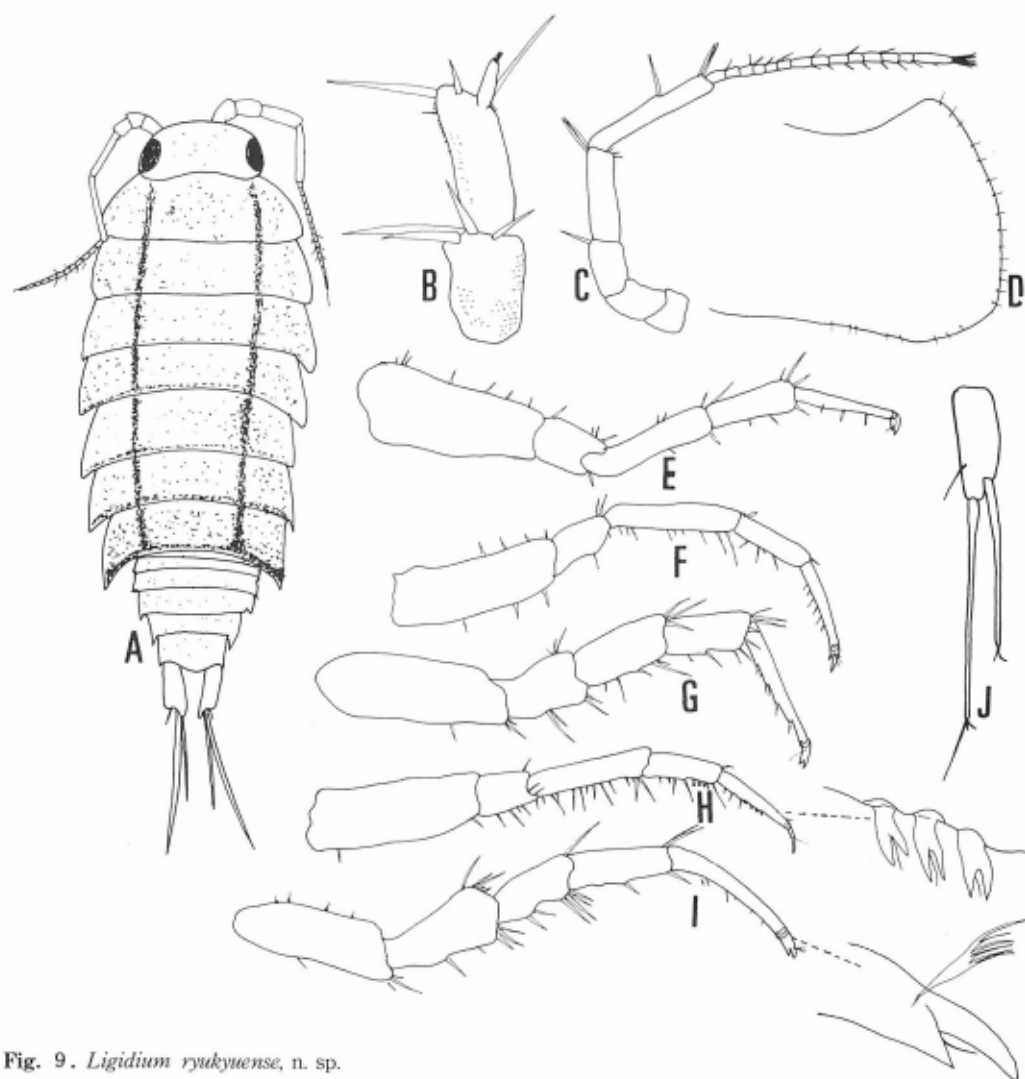


Fig. 9. *Ligidium ryukyuense*, n. sp.

A. Dorsal view; B. First Antenna; C. Second antenna D. Lateral part of first peraeonal somite; E-I. Third to seventh peraeopod; J. Uropod. (All: Holotype male).

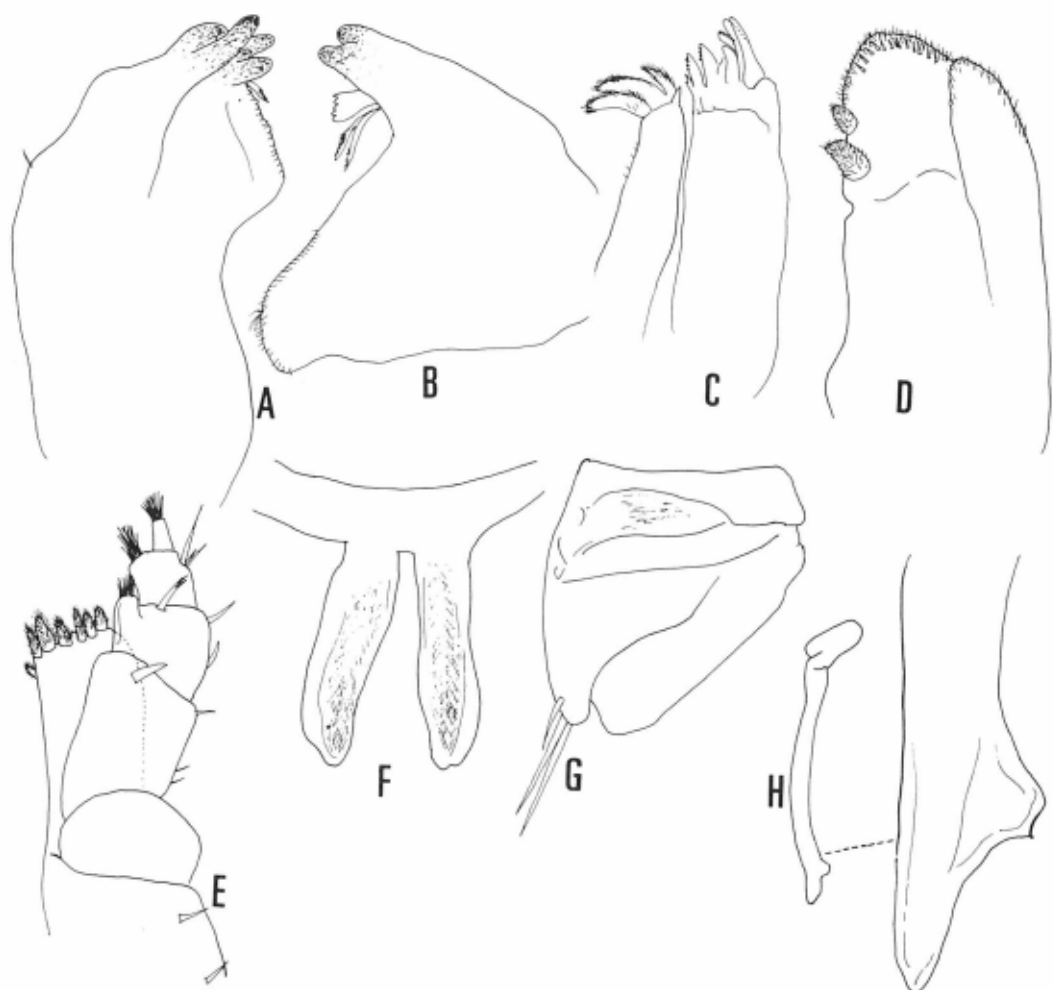


Fig. 10. *Ligidium ryukyuense*, n. sp.

A. Left mandible; B. Right mandible; C. First maxilla; D. Second maxilla; E. Maxilliped; F. Penes; G. Male first pleopod; H. Stylus of male second pleopod. (A-B, D-E: Paratype female, C, F-H: Holotype male).

truncated at the tip and with 7 hairy bristles; palp 5-segmented.

First to fifth peraeopods typical in shape. Sixth peraeopod with some bifid setae on the inner margins of carpus and propodus. Seventh peraeopod longer than the preceding ones.

Penes (Fig. 10F) short and rectangular. Stylus of male second pleopod (Fig. 10H) with a trapezoidal large tooth near the tip, and with 4 denticles near the tooth in some specimens but inconspicuous in other specimens.

Uropod (Fig. 9J); basis with a simple seta near the medial part; exopodite shorter than the endopodite; each with 2~3 setae at the tip.

Remarks: The present new species is most closely allied to *Ligidium koreanum* FLASAROVA from Korea and Kyushu, but the former is separated from the latter in the following features: (1) shape of stylus on male second pleopod, (2) more numerous ocelli of eyes, and (3) shape of mouth part, especially of mandible.

***Ligidium paulum* NUNOMURA, 1976**

(Jap. name: Nihon-chibi-himefunamushi, new)

Fig. 11

Ligidium paulum NUNOMURA, 1976.

Material examined 1♂ 1♀ Nakayama-ootaki, Saji-mura, Yazu-gun, Tottori Pref., coll. Yoshiaki Nishikawa, Mar. 19~20, 1978: 2♂♂ 11♀♀ Oiwake, Shin-hikida, Tsuruga City, Fukui Pref., coll. Shingo Tanaka, May 11, 1981: 1♀ Ashû, Miyama-chô, Kitakuwata-gun, Kyoto Pref., coll. Jirô Tsukamoto, June, 1976.

Description: Body surface with numerous small tubercles. Body colour brown in mature specimen but paler in younger ones. First peraeonal somite with 20~30 minute bristles in to group on hind lateral border. Eyes rather big with 20 to 30 ocelli.

First antenna composed of 3 segments; terminal segment is almost vestigial. Second antenna with 5-segmented peduncular segments and 6 to 8 flagellar segments; terminal flagellar segment with a tuft of setae at the tip.

Right mandible with 3-headed pars incisiva; lacina mobilis not chitinized; 3 hairy bristles between pars incisiva and processus molaris. Left mandible with 3-headed pars incisiva; lacina mobilis with 4 chitinized teeth; 3 hairy bristles between pars incisiva and processus molaris; processus molaris more highly-crowned in left than in right. First maxilla with 2 lobes; outer lobe with 3 large teeth and 2 or 3 smaller teeth; inner lobe with 3 stout hairy bristles. Second maxilla obscurely divided into 2 lappets, each with haired tip. Maxilliped with 5-segmented endopodite; each segment with 1 to 3 stout setae.

All the peraeopods are similar in shape in both sexes. The setae are all of simple type.

Endopodite of male first pleopod with 3 setae on posterior medial corner. Male second

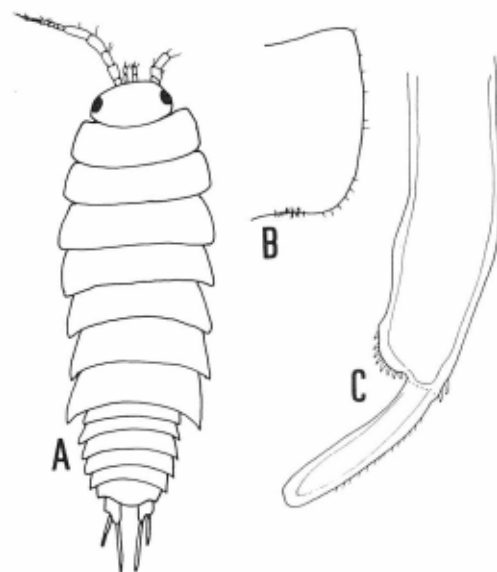


Fig. 11. *Ligidium paulum* NUNOMURA, 1976

A. Dorsal view; B. First peraeal somite; C. Stylus of male second pleopod (All: Specimen from type locality).

pleopod with a long stylus bearing about 5 small teeth and a long lappet at the tip.

Uropod with a seta near the base of basis; expodite somewhat short than the endopodite; expodite with 3 setae at the tip and many small setae at lateral border; endopodite with 2 long setae at the tip and many small setae at lateral border.

Remarks: The present species is found together with *japonicum* in some localities; the former is readily distinguished, however, from the latter in the following features; (1) smaller size, (2) rough body surface, (3) less numerous segmented flagellum of second antenna, (4) shape of mouth part, especially of maxilliped, (5) presence of a group of bristles on hind lateral border of the first pereaeonal somite, (6) shape of stylus on male second pleopod, (7) shape of penes, (8) shape of uropod and (9) absence of deep groove on forehead.

This species seems to be most closely allied to the 2 species immediately below in this paper; the differences will be shown in each description of the latter.

***Ligidium kiyosumiense*, n. sp.**

(Jap. name: Kiyosumi-chibi-himefunamushi, new)

Figs. 11 to 13

Material examined: 5♂♂ (1♂ holotype, 4.1 mm in body length and 4♂♂ paratypes, 3.7~5.0 mm in body length) and 6♀♀ (1♀ allotype, 4.1 mm in body length and 5♀♀ 4.0~5.8 mm in body length), Mt. Kiyosumi-yama, Awakominato-machi, Awa-gun, Chiba Pref., coll. Hiroyuki Kato, May 24, 1975. 6♀♀, Mt. Kiyosumiyama, Amatsukominato-machi, Awa-gun, Chiba Pref., coll. Hiroyuki Kato, May, 1979; 1♂ 1♀, Kamegasawa, Amatsukominato-machi, Awa-gun, Chiba Pref., coll. Hiroyuki Kato. Type specimens are deposited as follows: holotype (TOYA-Cr-1430), allotypes (TOYA-Cr-1431) and 6 paratypes (TOYA-Cr-1427~1429, 1432~1434) at the Toyama Science Museum, 1 paratype (OMN H-Ar-2844) at the Osaka Museum of Natural History and 1 paratype (NSMT-Cr-8674) at the National Science Museum, Tokyo.

Description: Body oval (Fig. 12), 3.7 times as long as wide. Body surface with minute granules. Body colour brown. Eyes rather small, each with 30~40 ocelli.

First antenna (Fig. 13A) small and composed of 3 segments; first almost round with 3 big setae at distal corner and several denticles on the margin; second segment also round with 2 long setae near the tip and about a dozen denticles on lateral margin; terminal segment vestigial with 3 fine setae at the tip.

Second antenna (Fig. 13B) with 5 peduncular segments and 6 flagellar segments; each flagellar segment with 1 or 2 setae



Fig. 12. *Ligidium kiyosumiense*, n. sp. Dorsal view of holotype male.

and terminal segment with a tuft of setae at the tip.

Right mandible (Fig. 14B); pars incisiva composed of 2 teeth; lacina mobilis chitinized with 4 serrated tip; 3 hairy bristles between lacina mobilis and processus molaris. Left

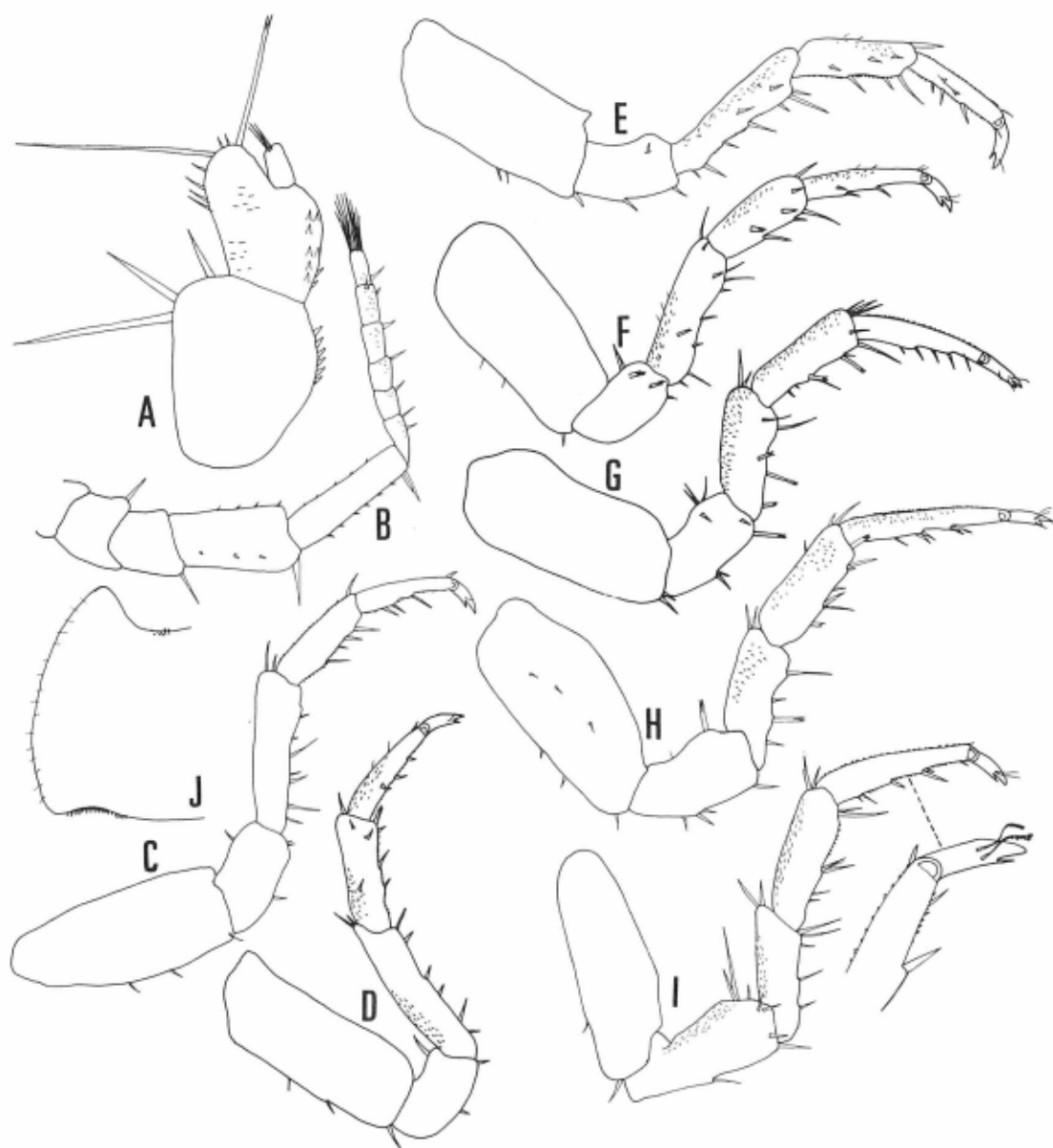


Fig. 13. *Ligidum kiyosumiense*, n. sp.

A. First antenna; B. Second antenna; C-I. First to seventh pereopods; J. Lateral part of first pereopodal somite (All: Holotype male).

mandible (Fig. 14A); pars incisiva composed of 3 teeth; lacina mobilis composed of 4 teeth; processus molaris is low-crowned in both mandibles. First maxilla (Fig. 14C-D); outer lobe with 4 larger and 2 smaller teeth at the tip; inner lobe with 3 stout hairy bristles at the tip.

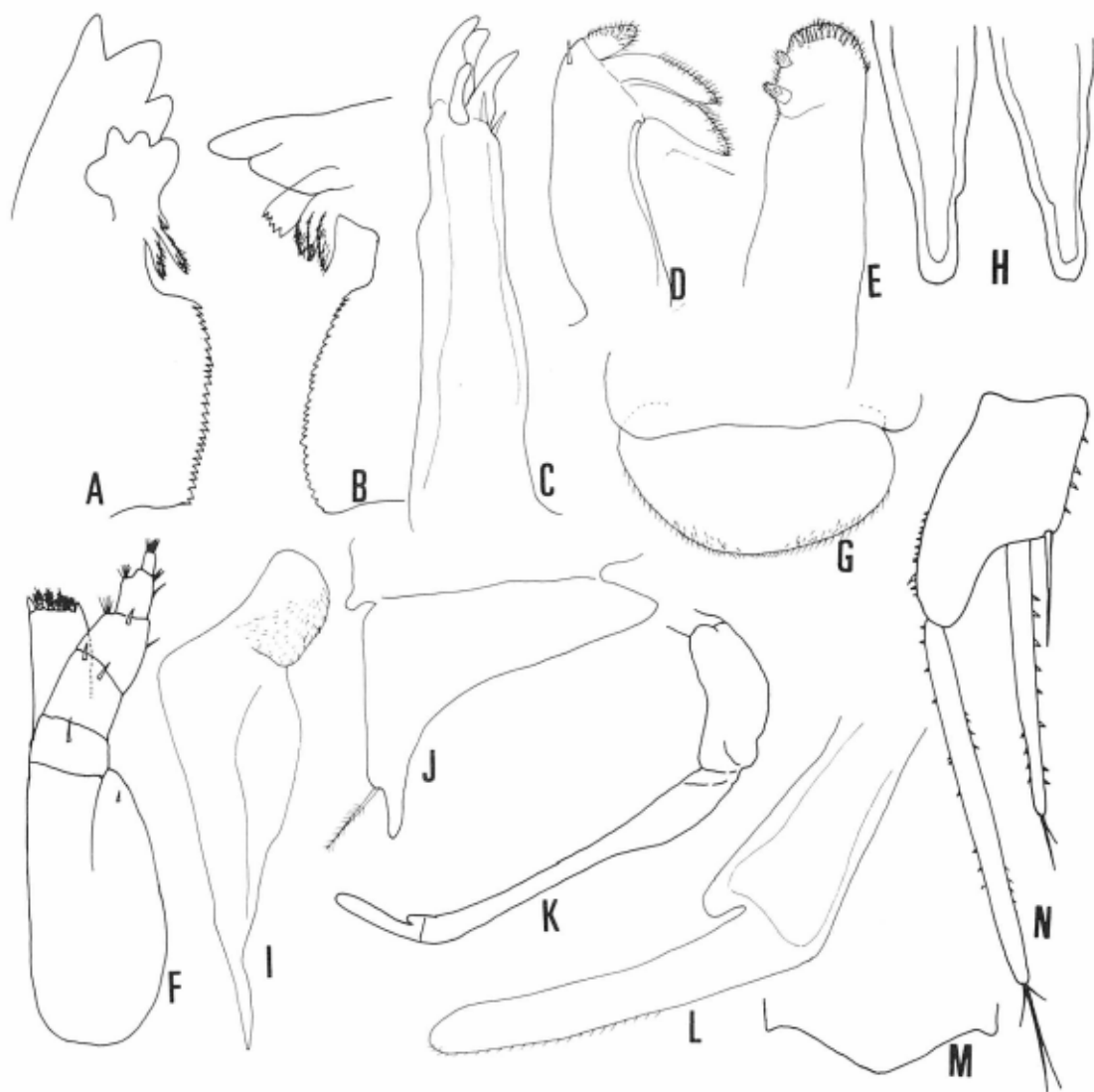


Fig. 14. *Ligidium kiyosumiense*, n. sp.

A. Left mandible; B. Right mandible; C. Endopodite of first maxilla; D. Exopodite of the same; E. Second maxilla; F. Maxilliped; G. Labrum; H. Penes; I. Endopodite of male first pleopod; J. Exopodite of male second pleopod; K. Stylus of the same; L. Apical part of the same; M. Telson, N. Uropod (A-B, E-F: Paratype female, C-D, G: Allotype female, H-I: Holotype male).

Second maxilla (Fig. 14E) with 2 haired bristles near the tip. Maxilliped (Fig. 14F) with 5-segmented palp; each segment with 1 to 3 stout setae and demarcation is perfect.

All the peraeopods (Fig. 15C-I) similar in shape; basis oblong with about 3 setae; ischium rectangular; merus oblong with 6 to 13 setae; carpus rectangular with 7 to 8 setae; propodus oblong with 3 to 5 setae on inner margin and many spines on outer margin; bactylus bifid.

Penes short (Fig. 14H). Male first pleopod (Fig. 14I) tapering to the tip. Stylus of male second pleopod (Fig. 14K-L) long, with a stick-like structure but without any denticle. Posterior margin of pleotelson round (Fig. 14M). Uropod (Fig. 14N); basis with a long seta at inner border; exopodite about 2/3 time as long as the endopodite; each with a few of setae at the tip.

Remarks: The present new species is most closely allied to *Ligidium paulum* NUNOMURA described from Ashû Kyoto Prefecture. Apparently the speciation of these two species might have happened not so long ago. The former is separated from the latter in the following features: (1) shape of male second pleopod; longer apical part and absence of denticle, (2) presence of bifid-typed setae of peraeopod, and (3) shape of penes.

Ligidium iyoense, n. sp.

(Jap. name: Iyo-chibihimefunamushi, new)

Fig. 14 and 15

Material examined: 2♂♂ (1♂ holotype, 5.3 mm in body length, and 1♂ paratype 3.3 mm in body length), and 15♀♀ (1♀ allotype, 4.4 mm in body length and 15♀♀ paratypes, 4.3~5.8 mm in body length) from the litter zone, 600 m in altitude, Narayabu, Yanadani-mura, Kamiukena-gun, Ehime Pref., coll. Yoshiaki Nishikawa, Mar. 21, 1976. Type specimens are deposited as follows: holotype (TOYA - Cr - 1444), allotype (TOYA - Cr - 1445), and 9 paratypes (TOYA - 1446~1454) at the Toyama Science Museum, 3 paratypes (OMNH - Ar - 2842~2844) at the Osaka Museum of Natural History and 3 paratypes (TSMT - Cr - 8673) at the National Science Museum, Tokyo.

Description: Body relatively oblong, about 3.5 times as long as wide. Body surface with numerous minute granules all over. Body colour blackish brown. First peraeonal somite with minute bristles in group on hind-lateral borders. Eyes rather small with about 30 ocelli.

First antenna (Fig. 16G) with 3 segments; first segment square in shape with a larger and a smaller spines; second segment also square in shape with 2 larger spines and a smaller one; terminal segment almost vestigial. Second antenna (Fig. 15B and C) rather short; peduncle composed of 5 segments; flagellum composed of 7~8 segments in male but 7 in female; each flagellar segment with many short transverse patterns on the surface and with 2 setae at distal end; terminal segment with a tuft of relatively long setae.

Right mandible (Fig. 16B); pars incisiva composed of 3 strong teeth; lacina mobilis not chitinized and with about 4 teeth; 3 hairy setae between lacina mobilis and processus molaris. Left mandible (Fig. 16A); pars incisiva composed of 3 teeth; lacina mobilis composed of 2

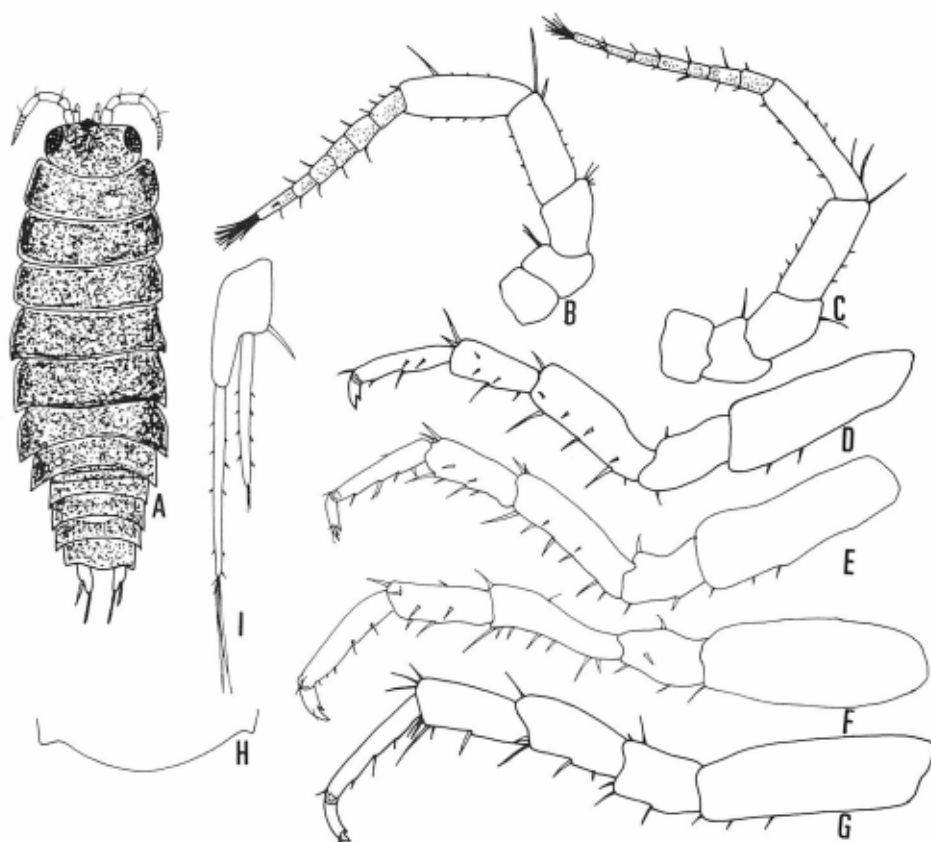


Fig. 15. *Ligidium iyoense*, n. sp.

A. Dorsal view ; B. Second antenna of male ; C. Second antenna of female ; D-F. First to third pereopods ; G. Fifth pereopod ; H. Telson, I. Uropod (A-B, D-I ; Holotype male ; C. Allotype female).

chitinized teeth ; processus molaris more highly crowned than in right one. First maxilla (Fig. 16C-D) with 2 lobes ; inner lobe with 3 larger and stouter teeth and 2 short and acute teeth at the tip ; outer lobe with 3 stout hairy bristles, one of which much shorter than the remaining ones. Second maxilla (Fig. 16E) with 2 short hairy bristles near the tip ; apical part with many hair and 2 setae. Maxilliped (Fig. 16F) slender ; palp clearly divided ; endopodite with 5 stout hairy setae at the tip.

All the pereopods similar in shape in both sexes ; basis oblong and stout ; ischium short ; merus long with several long setae on inner margin and some short setae on lateral side ; carpus rectangular with a few of long setae on inner margin and several setae on both sides ; propodus long and especially longer in the posterior legs ; bactylus bifid, outer tooth is longer than the inner one.

Penes (Fig. 16I) relatively short and simple. Stylus on male second pleopod (Fig. 16J)

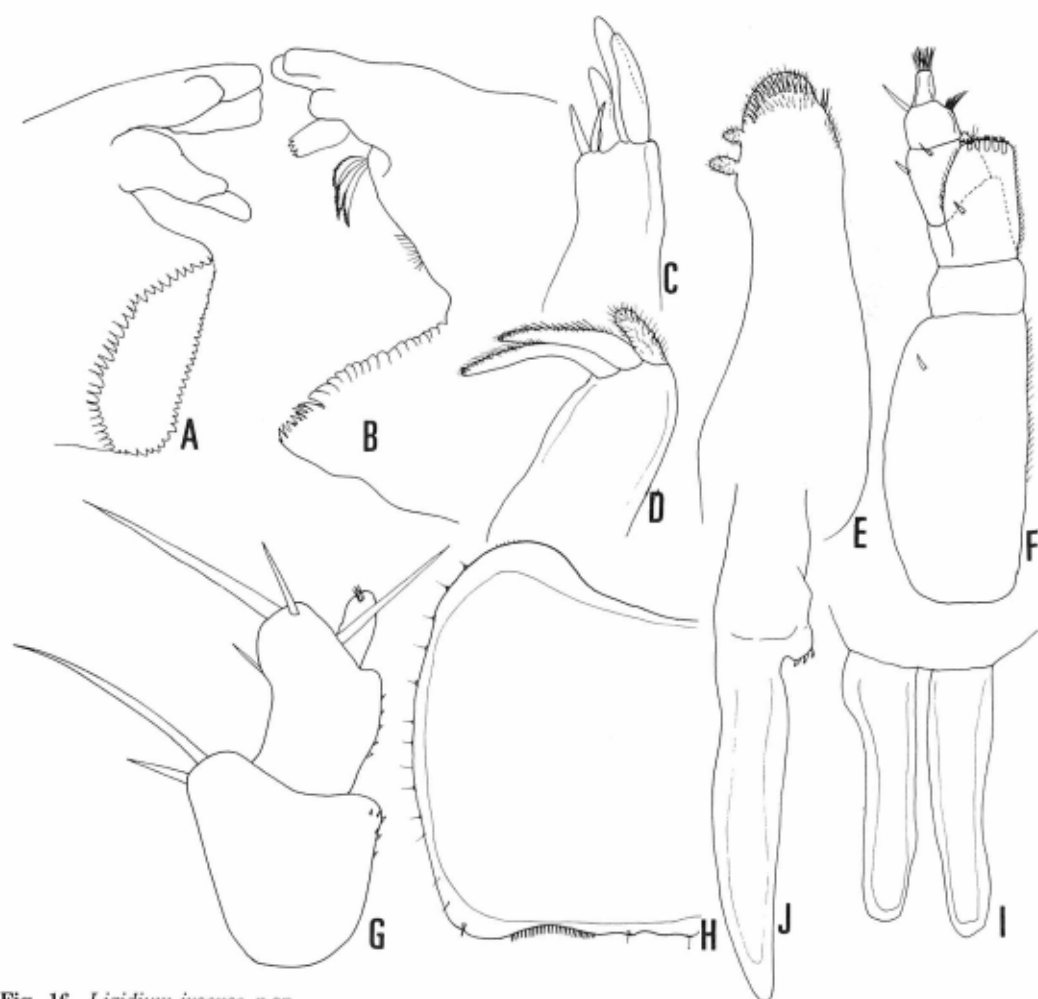


Fig. 16. *Ligidium iyoense*, n.sp.

A. Left mandible; B. Right mandible; C. Inner lobe of first maxilla; D. Outer lobe of the same, E. Second maxilla; F. Maxilliped; G. First antenna; H. First pereopodal somite; I. Penes; J. Stylus of male second pleopod (All: Holotype male).

relatively short; its tip club-shaped and simple; a small tubercle with 3 denticles exists almost medial inner part. Uropod (Fig. 15I) with a long seta near the base of basis; exopodite pretty shorter than the endopodite; exopodite with 2 setae at the tip; endopodite with 2 long setae at the tip.

Posterior margin of telson (Fig. 15H) rounded.

Remarks: The present new species is most closely allied to *Ligidium paulum* NUNOMURA

described from Ashū, Kyoto Prefecture, but the former differs from the latter in the following features: (1) narrower body shape, (2) shape of stylus on male second pleopod, and (3) shape of penes.



Fig. 17. Map showing the geographical distributions of the genus *Ligidium*. The data include a few records written by some scientists.

Family Trichoniscidae Sars, 1899

(Jap. name: Naga-warajimushi-ka)

This family is characterized by its small size, thin flagellum of second antenna, lack in the habit of body enrolling, reduction of pseudotracheal system and so on.

The family has, because of its small size and inconspicuousness, remained almost unknown in Japan except several cave-dwelling species, though the number of the Japanese species might in fact be by no means small.

Key to the Japanese genera of the Family Trichoniscidae

- 1 With ribs or tubercles on dorsal surface of peraeonal somites. Pleon not contracted abruptly..... Genus *Haplophthlmus* SCHÖEHL, 1860
- 1' Without rib or tubercle on dorsal surface of peraeonal somites. Pleon contracted abruptly 2
- 2 Endopodite of male first pleopod copulatory..... Genus *Trichoniscus* BRANDT, 1833
- 2' Endopodite of male first pleopod thin with hairs..... 3
- 3 Stylus of male second pleopod with swollen tip Genus *Hyloniscus* VERHOEFF, 1908
- 3' Stylus on male second pleopod with slender tip Genus *Hondoniscus* VANDEL, 1968

Genus *Hyloniscus* SCHÖBL, 1861

(Jap. name: Hora-warajimushi-zoku, new)

This genus contains more than 30 species in Europa but only two species have been known in Japan; in this report two more species are added.

Key to the Japanese species of the Genus *Hyloniscus*

- 1 With eyes *H. kuramotoi* n. sp.
- 1' Without eye..... 2
- 2 Stylus on male second pleopod bearing hooks or spines..... 3
- 2' Stylus on male second pleopod without hook or spine *H. coronatus*, n.sp.
- 3 Stylus on male second pleopod with acute setae *H. uenoi* VANDEL, 1968
- 3' Stylus on male second pleopod with stout hooks *H. unidentatus* VANDEL, 1970

***Hyloniscus uenoi* VANDEL, 1968**

(Jap. name: Ueno-hora-warajimushi, new)

Fig. 18

Hyloniscus uenoi VANDEL, 1968

Material examined: 1♂, Himisedô, Hiraseyama, Nagayasu, Kaminaka-chô, Naka-gun, Tokushima Pref., coll. Schun'ichi Uéno, Apr. 2~3, 1967; 2♂♂, above mentioned locality, coll. Morisato Kiuchi, Dec. 10, 1967; 1♂ 3♀♀, above mentioned locality, coll. Schun'ichi Uéno, May 2, 1968; 1♀, Ryû-no-iwaya, Kuragô, Mt. Tairyûji-san, Anan City, Tokushima Pref., coll.

Morisato Kiuchi, Nov. 5, 1967; 2♀♀, Tôgen-daiichi-dô, Takano, Mt. Hizukayama, Naka-gun, Tokushima Pref., coll. Masataka Yoshida, July 23, 1967. These specimens are deposited at the National Science Museum, Tokyo.

Description : Body length up to 5 mm and 2.3 times as long as wide. Body colour white; pigment of tergite completely lacking.

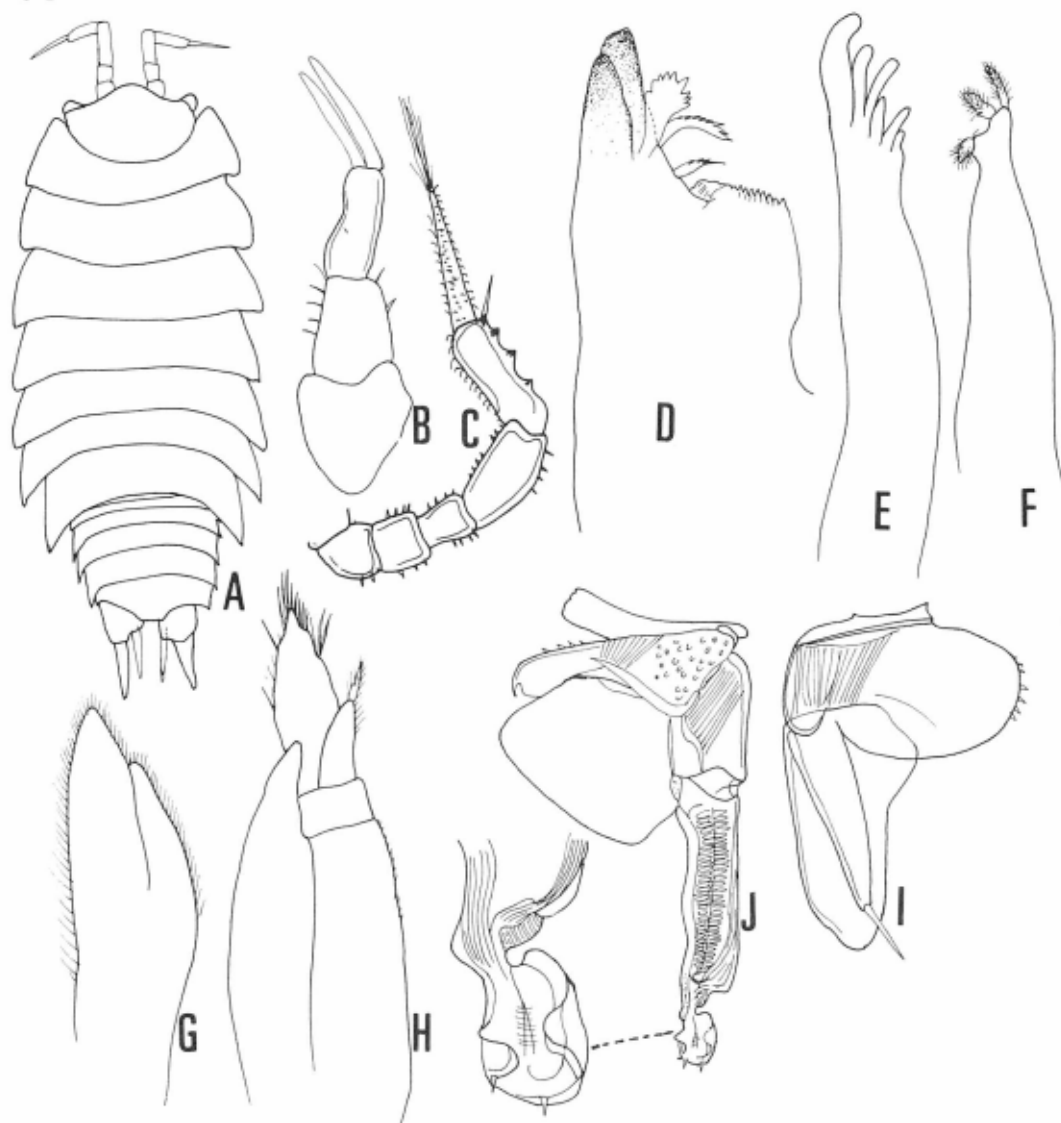


Fig. 18. *Hyloniscus uenoi* VANDEL, 1968

A. Dorsal view, B. First antenna; C. Second antenna; D. Right mandible; E. Outer lobe of first maxilla; F. Inner lobe of the same; G. Second maxilla; H. Maxilliped; I. Male first pleopod; J. Male second pleopod. (A-H: Specimens from Himisedô and Ryûno Iwaya, Tokushima Prefecture, I-J: Redrawn from Vandel's original description).

First antenna composed of 3 segments; size decreases towards the terminal segment; terminal segment slender with 4 aesthetascs at the tip. Second antenna reaches the posterior margin of the first peraeonal segment.

Right mandible (Fig. 18D); pars incisiva strong and composed of 2 teeth; lacina mobilis not chitinized with 9 teeth at the tip; 2 hairy bristles between lacina mobilis and processus molaris.

First maxilla (Fig. 18E and F); outer lobe with 6 teeth at the tip; inner lobe with 3 hairy bristles at the tip. Second maxilla (Fig. 18G) slender.

Maxilliped (Fig. 18H) slender.

Peraepods do not possess any sexual dimorphism, particularly, merus of male seventh peraeopod in Japan without any hook which is present in *Hyloniscus* in Europe.

First pleopod in male (Fig. 18I); endopodite rather typical within the genus *Hyloniscus*; endopodite triangular with a rather long seta at the tip.

Second pleopod in male (Fig. 18J) is typical in the genus *Hyloniscus*, but the tip of the endopodite with particularly complicated structure.

Uropod of endopodite a little shorter and thinner than exopodite.

Eye absent.

The tergites covered with little granulations; first peraeon bears 3 rows of granules, the first row is weaker; peraeons II-VII bears 2 rows of granules, one is medial and the other is posterior one; pleon smooth.

Hyloniscus unidentus VANDEL, 1970

(Jap. name: Hitotsutoge-hora-warajimushi, new)

Fig. 19

Hyloniscus unidentatus Vandel, 1970.

Material examined: 1♂, calcareous cave called "Shoten-no-iwaya" at Kashiwagi, Kawakami-mura, Yoshino-gun, Nara Pref., coll. Kiyoshi Mizushima, Sep. 15, 1969. The specimen is deposited at the National Science Museum, Tokyo.

Description: Body (perhaps!) ovate-oblong. Body colour white in alcohol. First maxilla (Fig. 19B); outer lobe slender with 3 stouter and 5 slenderer teeth at the tip; inner lobe slender with 3 hairy bristles on apical part. Maxilliped (Fig. 19C) simple in shape. Other appendages of mouthpart could not be observed.

Male seventh peraeopod (Fig. 19D) not so specialized. Male first pleopod (Fig. 19E); exopodite roundly triangular; endopodite with a long seta. Male second pleopod (Fig. 19F) is typical of this genus, but the tip of stylus is very complicated and bears horsebean-shaped structure equipped with 2 stout teeth-like hooks.

Remarks: The male first pleopod of this species resembles to that of *H. uenoi* but the former is stouter than the latter and terminal depression of *unidentatus* can hardly be observed. The tip of endopodite of male second pleopod resembles *uenoi* but the form of

terminal vesicle is different in shape ; that of *uenoi* is bell-shaped while that of *unidentatus* is ovoid. Lastly, outer part of the vesicle of *uenoi* with 2 spine-like structures, and that of *unidentatus* without such structures but with strong hooks.

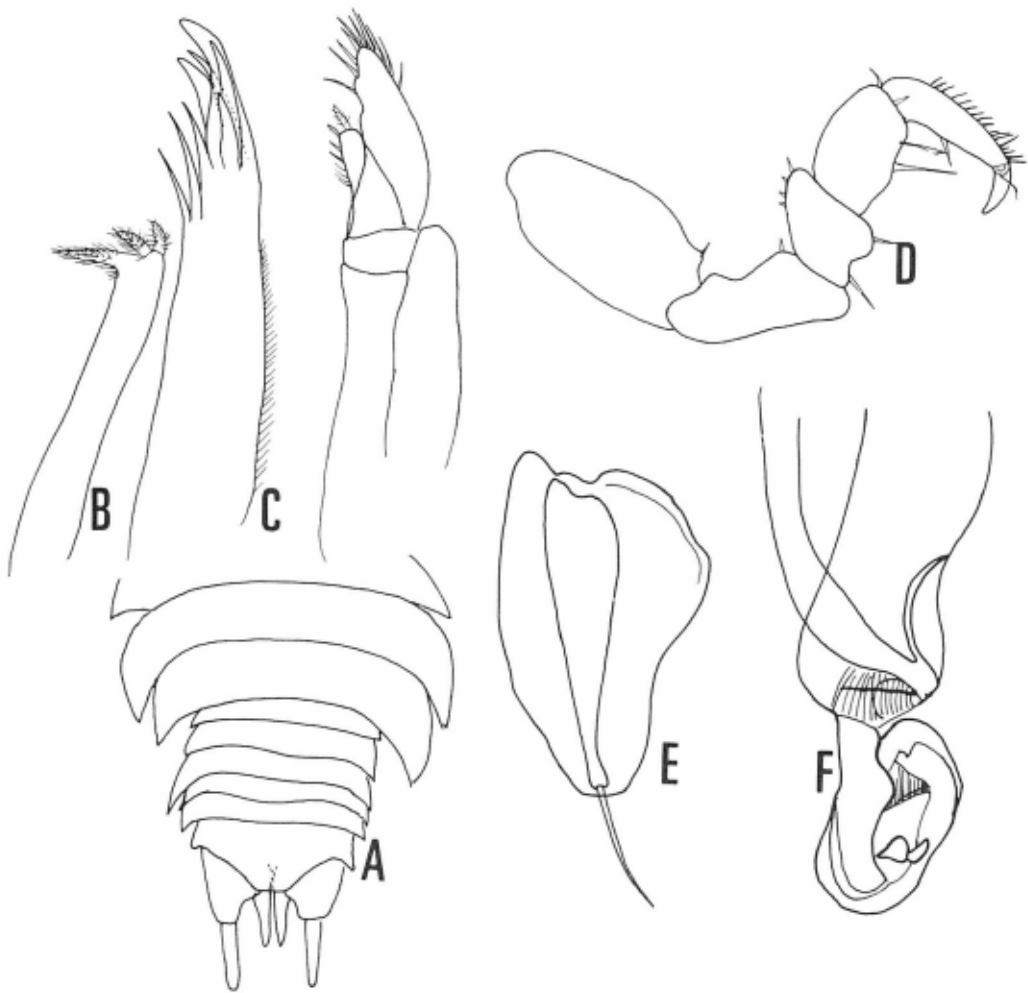


Fig. 19. *Hylonisucus unidentatus* VANDEL, 1970

A. Dorsal view of posterior part ; B. First maxilla ; C. Maxilliped ; D. Seventh pereopod ; E. Endopodite of male first pleopod ; F. Endopodite of second pleopod. (A-D : Specimen from Shoten-no-iwaya, Nara Pref., E-F : Redrawn from Vandel's original description).

Hyloniscus cornutus, n. sp.

(Jap. name : Tsuno-hora-warajimushi, new)

Figs. 20 and 21

Material examined : 4♂♂ (1♂ holotype, 4.0 mm in body length, 3♂♂ paratypes, 3.0~3.8 mm in body length) and 3♀♀ (1♀ allotype, 4.7 mm in body length and 2♀♀, paratypes, about 3.5 mm in body length), old mine, calle called "Tamadani-kô", Tamadani, Ryûjin-mura,

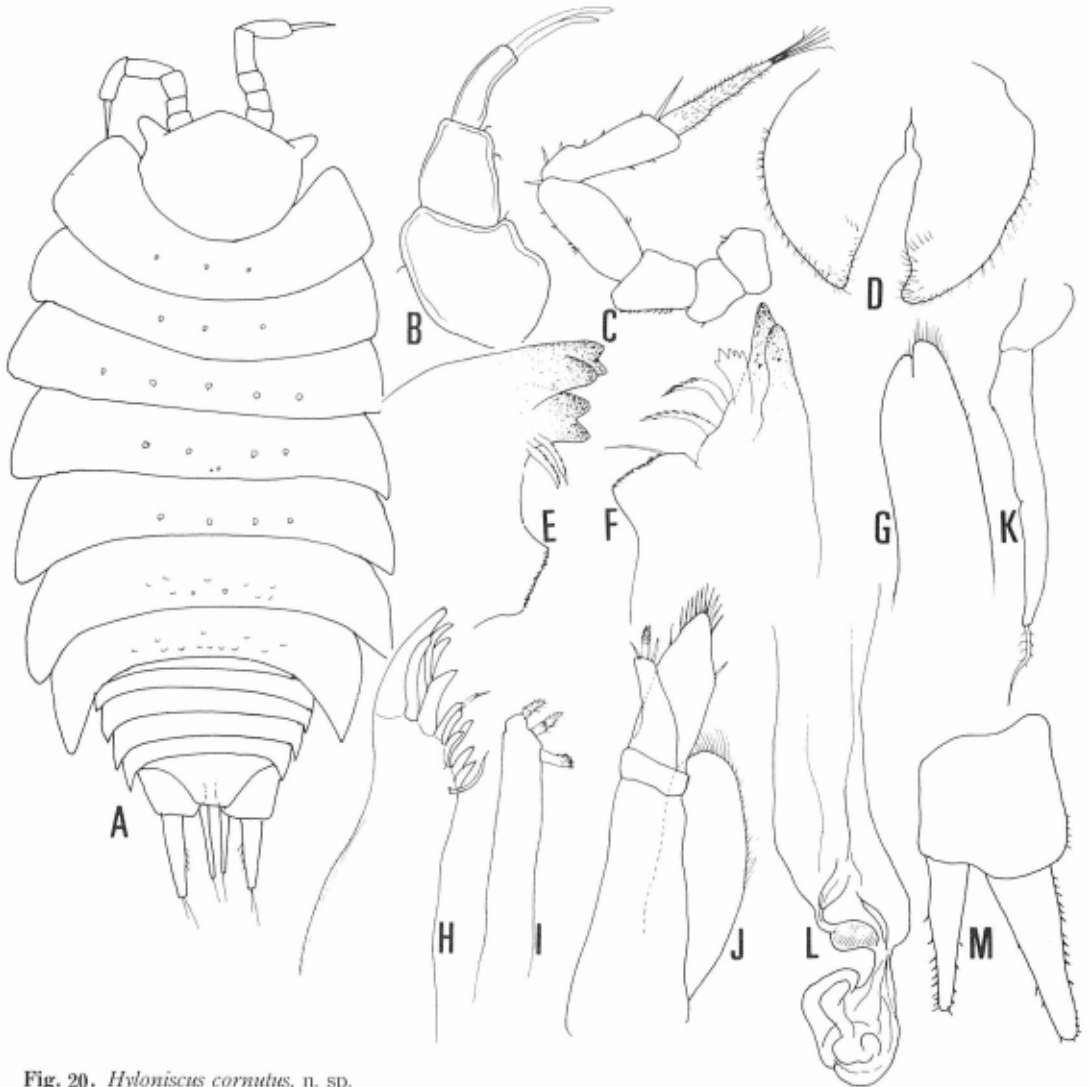


Fig. 20. *Hyloniscus cornutus*, n. sp.

A. Dorsal view ; B. First antenna ; C. Second antenna ; D. Labium ; E. Left mandible ; F. Right mandible ; G. Second maxilla ; H. Outer lobe of first maxilla ; I. Inner lobe of the same ; J. Maxilliped ; K. Endopodite of male first pleopod ; L. Tip of stylus of male second pleopod ; M. Uropod. (A-C, E-F, H-I, K-L : Holotype male, D, G, J, M ; Paratypes female)

Hidaka-gun, Wakayama Pref., coll. Hiroshi Minato, Mar. 4, 1979; 1♀ (paratype, 4.7 mm in body length), ruined mine, Shimodaira Aikawa, Ôtô-mura, Nishimuro-gun, Wakayama Pref., coll. Hiroshi Minato, Mar. 23, 1980. Type specimens are deposited as follows: holotype (TOYA-Cr-1772), allotype (TOYA-Cr-1773) and 2 paratypes (TOYA-Cr-1774~1775) at the Toyama Science Museum, 2 paratypes (OMNH-Ar-2846~2847) at the Osaka Museum of Natural History, 2 paratypes (TSMT-Cr-8675) at the National Science Museum, Tokyo.

Habitat: All the specimens were collected from the artificial cave, that is, ruined mines.

Description: Body ovate and oblong, about 2.1 times as long as wide. Body yellowish white in alcohol. Cephalon with 3 tubercles. First to sixth peraeonal somites with a row of 3 to 5 tubercles on dorsal surface. Seventh peraeonal somite and pleonal somites smooth.

First antenna (Fig. 20B) composed of 3 segments; first segment stout; second segment rectangular with 3 setae; terminal segment oblong with 2 long setae at the tip. Second antenna (Fig. 20C) reaches the middle part of first peraeonal somite; first to third peduncular segments almost square; fourth and fifth segments rectangular and with many fine setae;

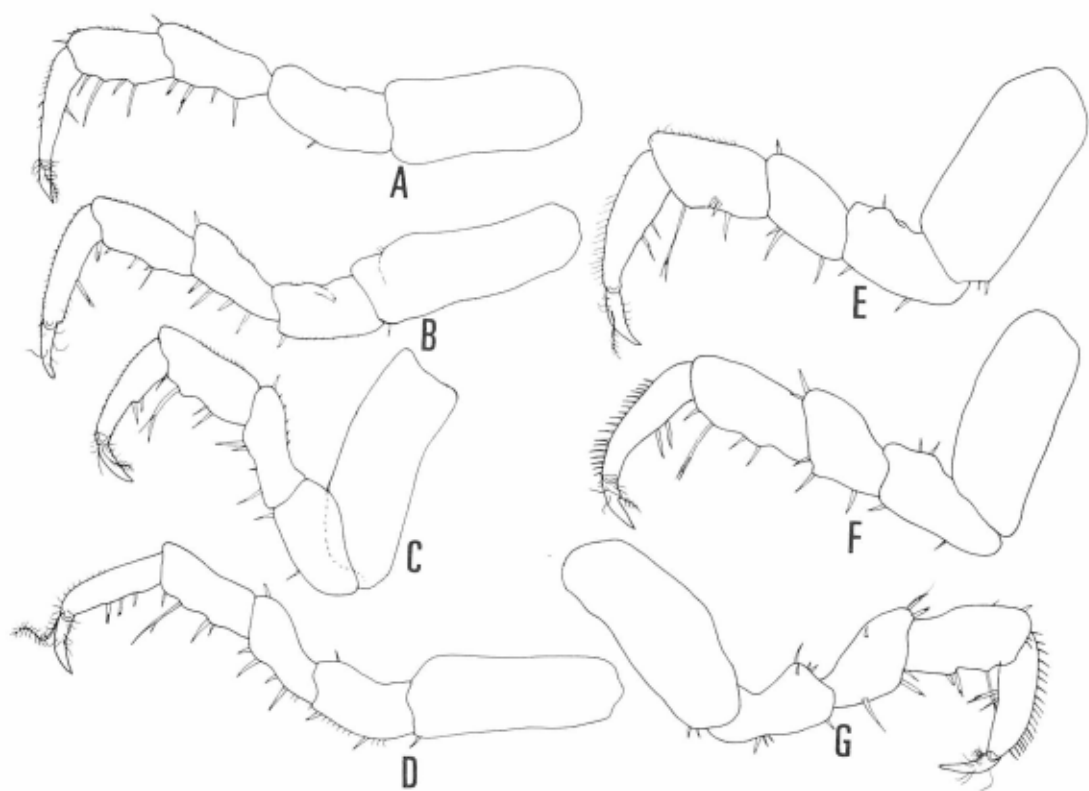


Fig. 21. *Hyloniscus cornutus*, n. sp.

A-D. First to fourth peraeopods; E-F: Sixth and seventh peraeopods; G: Male seventh peraeopod.
(A-F: Paratype female, G: Holotype male).

flagellum with 3 segments and with many setae at the tip.

Right mandible (Fig. 20F), pars incisiva composed of 2 strong teeth; lacina mobilis 5-headed, not chitynized; 2 hairy setae between lacina mobilis and processus molaris. Left mandible (Fig. 20E); pars incisiva composed of 3 strong teeth; lacina mobilis 2-headed; 2 hairy setae between lacina mobilis and processus molaris. First maxilla (Fig. 20H) with 12 ordinary teeth and 2 slender teeth at the tip of outer lobe; 3 slender hairy bristles at the tip of inner lobe. Second maxilla (Fig. 20G) slightly divided into 2 lappets, each with relatively long setae on distal margin. Maxilliped (Fig. 20J); endopodite narrow and with a stout and 2 simple setae at the tip; palp lanceolate with about a dozen setae on distal margin.

All the pereopods in both sexes almost similar in shape; basis rectangular; ischium rectangular with several setae; merus rectangular, but that of pereopod VII with some bifid setae on inner margin, especially in male; carpus rectangular; propodus oblong, especially that of pereopod VII with many relatively long setae densely on outer margin.

Penes club-shaped. Male first pereopod (Fig. 20K); endopodite 2-segmented and slender, whose tip bears a thread-like structure. Male second pleopod (Fig. 20L) with 2-segmented endopodite, terminal segment long and with pretty complicated structure but without beak-like structure. Uropod (Fig. 20M) short; basis almost square; endopodite longer than the exopodite; both with a few of setae at the tip.

Remarks: The present new species is the third species of the genus recorded in Japan. It resembles most closely *H. unidentatus* but the former is separated from the latter in the following features; (1) absence of beak-like structure in the apical part of male second pleopod, (2) shape of male first pleopod, and (3) more numerous dentation of teeth of first maxilla.

***Hyloniscus kuramotoi*, n. sp.**

(Jap. name: Kuramoto-hora-warajimushi, new)

Figs. 22 and 23

Material examined: 3♂♂ (1♂ holotype, 3.6 mm in body length and 2♂♂ paratypes, 3.3 and 3.5 mm in body length), calcareous cave called "Sazare-dô", Fukue-mura, Abu-gun, Yamaguchi Pref., coll. Tadashi Kuramoto, Nov. 2, 1977. Type specimens are deposited as follows: holotype (TOYA-Cr-1843) at the Toyama Science Museum, 1 paratype (OMNH-Ar-2848) at the Osaka Museum of Natural History, and 1 paratype (TSMT-Cr-8676) at the National Science Museum, Tokyo.

Description: Body oval-oblong, about 2.4 times as long as wide. Body white in alcohol. Eyes small, each composed of 3 ocelli.

First antenna (Fig. 23A-B) small and composed of 2 segments; first segment big and stout; second segment oblong and rectangular with several setae on both margins; terminal segment slender with 2 or 3 aesthetascs. Second antenna (Fig. 23C) reaches the medial part of first pereopod segment and composed of 5 peduncular segments; flagellum composed

of 3 segments with about 10 setae at the tip.

Right mandible (Fig. 22B); pars incisiva composed of 3 teeth; lacina mobilis with about 10 teeth, not chitinized; 2 hairy setae between lacina mobilis and processus molaris. Left mandible (Fig. 22C); pars incisiva composed of a single tooth; lacina mobilis 3-headed; 2 hairy setae between lacina mobilis and processus molaris.

Peraeopods are typical of the genus. Penes (Fig. 22D) long with round apical part. Male first pleopod (Fig. 22E) with a long endopodite. Endopodite of male second pleopod (Fig. 22F)

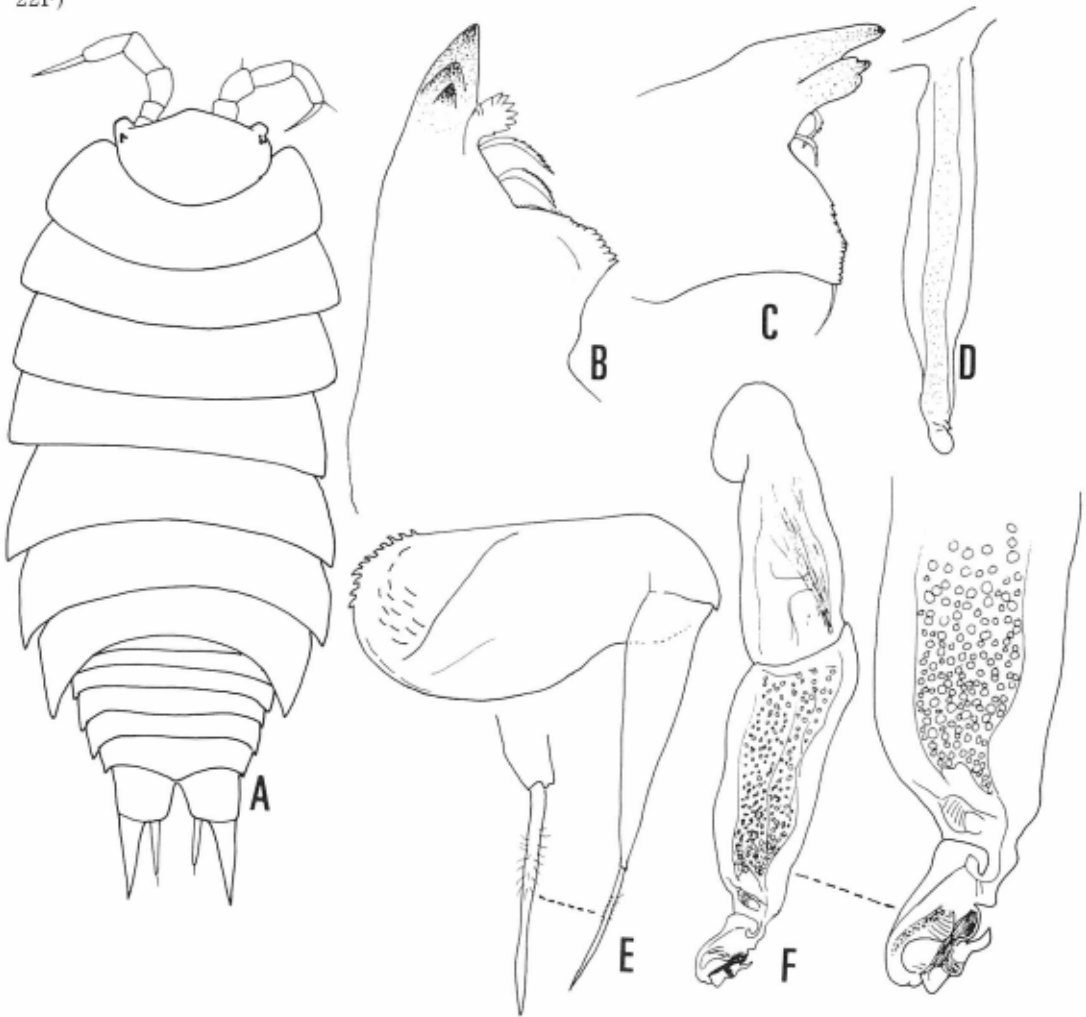


Fig. 22. *Hyloniscus kuramotoi*, n. sp.

A. Dorsal view; B. Right mandible; C. Left mandible; D. Penes; E. First male pleopod; F. Stylus of the male second pleopod. (All: Holotype male).

complicated with a sharp tooth near the tip. Uropod (Fig. 23I) short; basis stout; exopodite triangular with a seta; endopodite also triangular but a little shorter than the exopodite which is equipped with a long seta.

Remarks: The present new species, though rather easily separated from the other Japanese species of the genus, is most closely allied to *H. uenoi* VANDEL, but the former is separated from the latter in the following feature: (1) presence of eyes, (2) shape of apical part of stylus on male second pleopod, (3) longer endopodite of male first pleopod and so on.

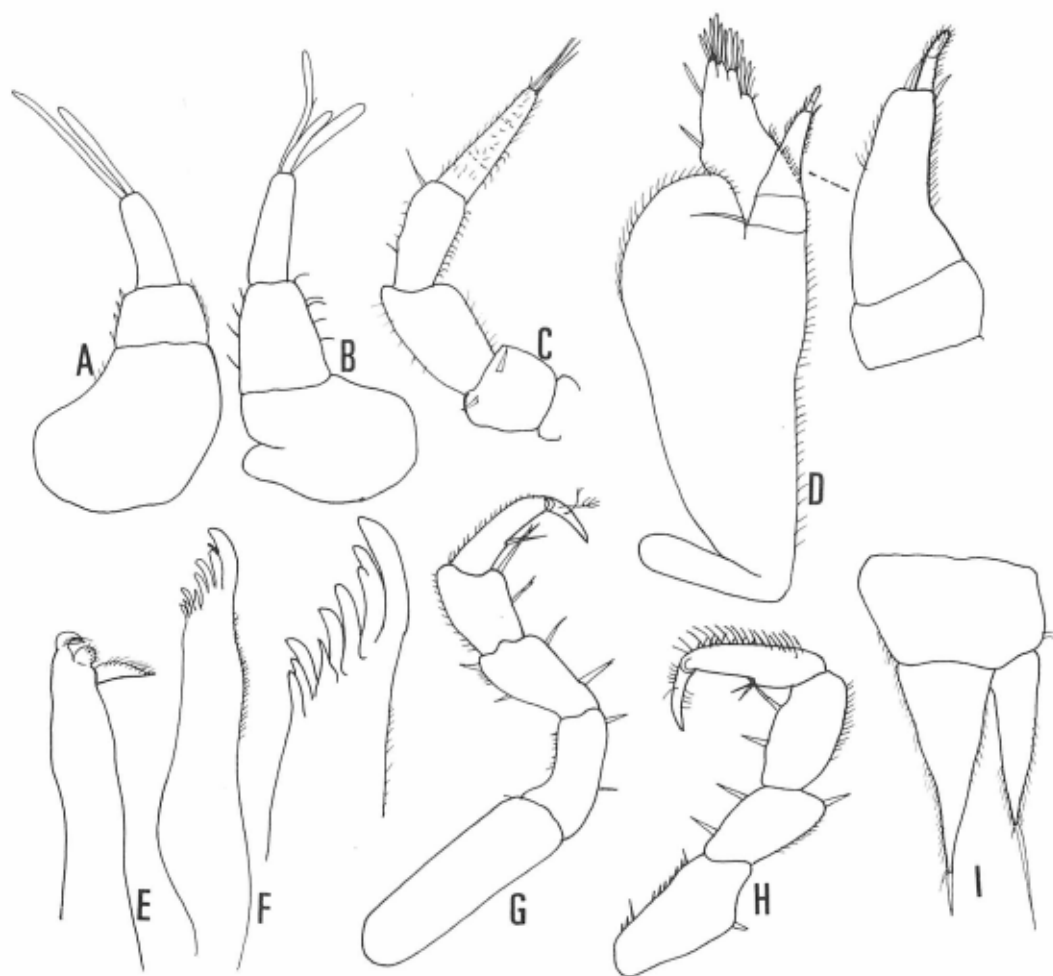


Fig. 23. *Hyloniscus kuramotoi*, n. sp.

A. First antenna; B. First antenna of another specimen; C. Second antenna; D. Maxilliped; E. Inner lobe of first maxilla; F. Outer lobe of the same; G. First peraeopod; H. Seventh peraeopod; I. Uropod. (A, C-I Holotype male, B. Paratype male).

Genus *Hondoniscus* VANDEL, 1968

(Jap. name : Hondo-warajimushi-zoku)

This is the second genus of cave-brewlling trichoniscids in Japan. Hitherto only a single species, *Hondoniscus kitakamiensis* VANDEL, has been known in Japan and other countries. This genus is allied to *Hyloniscus* VERHOEFF, but is characterized in having slender endopodite on male second pleopod and reduced maxilliped.

Hondoniscus kitamiensis VANDEL, 1968

(Jap. name : Hondo-warajimushi, new)

Fig. 24

Hondoniscus kitakamiensis VANDEL, 1968.

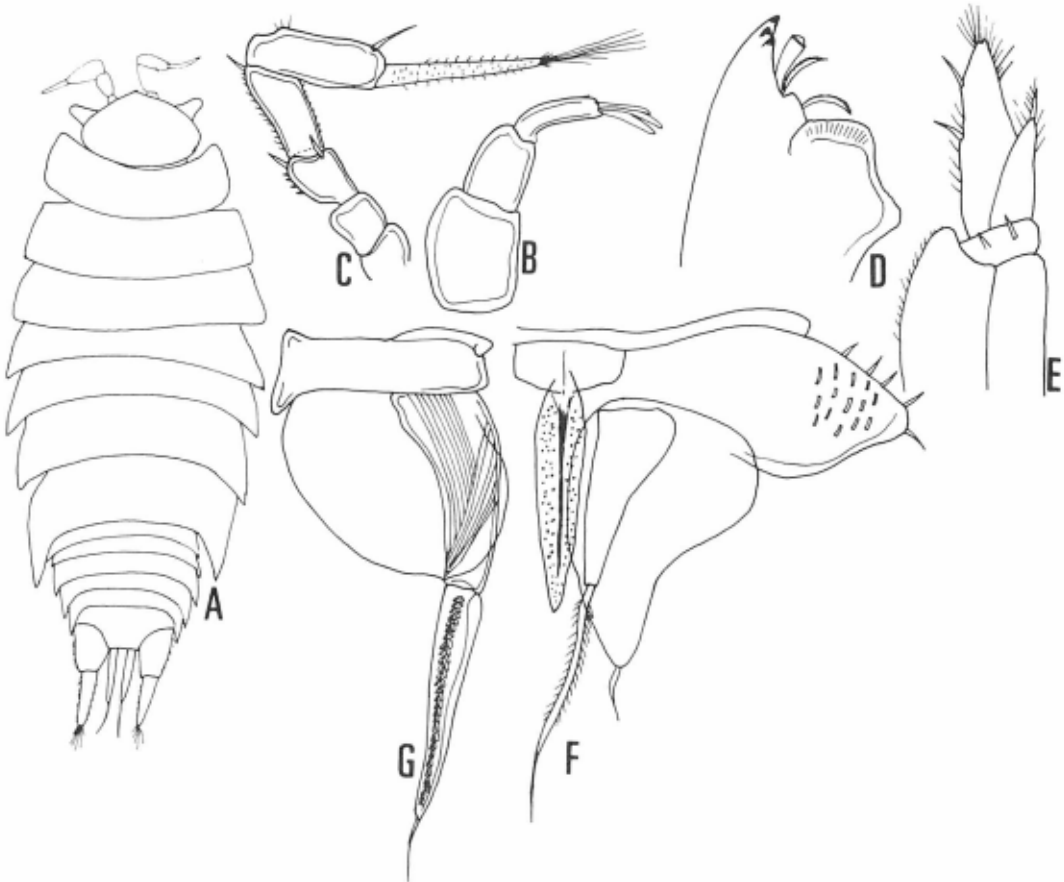


Fig. 24. *Hondoniscus kitakamiensis* VANDEL, 1968.

A. Dorsal view ; B. First antenna ; C. Second antenna ; D. Right mandible ; E. Maxilliped ; F. Penes and male first pleopod ; G. Male second pleopod.

(A-C : Specimen from Kitakami, Iwate Pref., D-G : Redrawn from Vandel's original description).

Material examined: 1♂ 1♀, from the cave called "Ryûsen-dô", Kannari, Mt. Kitakami, Iwaizumi-chô, Shimohei-gun, Iwate Pref., coll. Schun'ichi Uëno, July 26, 1968. The specimens are deposited at the National Science Museum, Tokyo.

Description: Body ovate, 2.4 times as long as wide, reaching 3.0 mm in length except antennae. Body colour pure white, tergite without any pigment. Eye absent. Cephalon with 3 rows of granulations. Each peraeonal somite with 2 rows of granulations, these granulations become small and thin in the posterior somites and disappear on lateral parts of the peraeonal somites IV-VII. The surface of pleonal somites and telson are smooth. Telson almost triangular.

First antenna (Fig. 24B) composed of 3 segments; first segment stout; second segment rectangular; terminal segment slender with 3 aesthetascs at the tip. Second antenna (Fig. 24C); first and second segments square in shape without seta; third segment square with 2 setae and 5 spines; fourth segment oblong with a seta; fifth segment oblong with a long seta at distal corner; flagellum indistinctly divided and with many long setae at the tip.

Penes club-shaped. Male first pleopod (Fig. 24F) of a primitive type; exopodite 2-segmented, terminal segment long and slender. Male second pleopod (Fig. 24G); stylus long with a relatively long hair at the tip.

Genus *Trichoniscus* BRANDT, 1833

(Jap. name: Chibi-warajimushi-zoku)

Tergite smooth or scaled, but not granulated. Eyes composed of 3 ocelli arranged triangularly or rarely absent. Flagellum of second antenna 3~4 articulated but demarcation is sometimes indistinct. Right mandible with 2 hairy setae and left mandible with 1 hairy seta.

Trichoniscus (?) sp.1

Fig. 25

Material examined: 1♂, Sueyoshi, Shuri, Naha City, Okinawa Island, Okinawa Pref., coll. Hiroshi Hoshikawa, Mar. 30, 1982. This specimen is deposited at the Toyama Science Museum (TOYA-Cr-1841).

Description: Body small, 2.9 mm in length, and 3.2 times as long as wide. Body colour pink alive but white in alcohol. Each eye composed of 3 ocelli, which are arranged triangularly.

First antenna (Fig. 25B) composed of 3 segments; second segment short; terminal segment oblong with 3 aesthetascs at the tip. Second antenna (Fig. 25C); peduncle 5-segmented; first segment square; second to fourth segments rectangular; fifth segment rectangular with 3 protuberances on outer margin; flagellum composed of 3 segments.

Right mandible (Fig. 25E); pars incisiva stout and composed of 2 teeth; lacina mobilis not chitinized but with 5 teeth at the tip; only 1 hairy seta was observed between lacina mobilis and processus molaris. Left mandible (Fig. 25D); pars incisiva composed of 3 teeth;

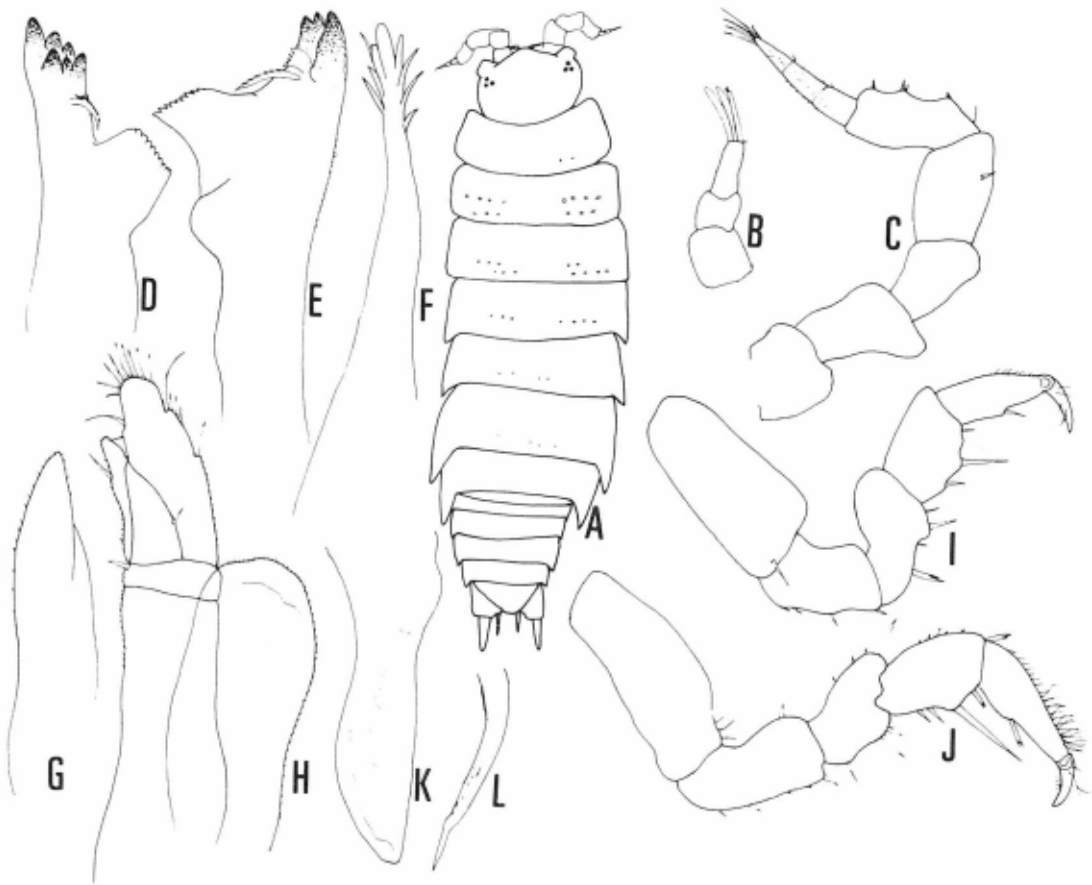


Fig. 25. *Trichoniscus* (?) sp.1

A. Dorsal view ; B. First antenna ; C. Second antenna ; D. Left mandible ; E. Right mandible ; F. outer lobe of first maxilla ; G. Second maxilla ; H. maxilliped ; I. First pereopod ; J. Seventh pereopod ; K. Tip of endopodite of male first pleopod ; L. Tip of endopodite of male second pleopod(?). (All: Male specimen from Naha).

lacina mobilis with 3 strong teeth, and almost similar to pars incisiva in shape ; 1 hairy seta between lacina mobilis and processus molaris. First maxilla (Fig. 25F) with 9 setae at the tip of outer lobe. Second maxilla (Fig. 25G) slender. Maxilliped (Fig. 25H) also slender.

Seventh pereopod in male normal in shape (Fig. 25J) ; basis oblong ; ischium rectangular with several setae ; merus almost square with 3~4 long setae ; carpus rectangular and with many setae and a long seta ; propodus relatively short with many long hairs on the outer margin.

Penes club-shaped. Stylus on male second pleopod slender and tapering toward the tip.

Trichoniscus (?) sp.2

Fig. 26

Material examined : 1♂, body length unknown because of deficiency in anterior part, Uotsuri Island, Senkaku Islands, Ishigaki City, Okinawa Pref., coll. Takuya Abe, May 31, 1979. This specimen is deposited at the Toyama Science Museum (TOYA-Cr-1776).

Description : Body elongated (perhaps!). Body creamy white in alcohol.

Penes club-shaped. Male first pleopod (Fig. 26B) ; exopodite triangular without any seta ; endopodite rather stout and tapering toward the tip.

Male second pleopod (Fig. 26C) ; exopodite ovoid with a seta on outer margin near the tip and with 2 rows of fine hairs on inner margin ; endopodite about 1.5 times as long as the exopodite and 2-segmented ; first segment rectangular ; second segment long and with lappet-like terminal part. Exopodite of stout with about 6 setae and several projections on each side.

Unfortunately the anterior part of the specimen was lacking.

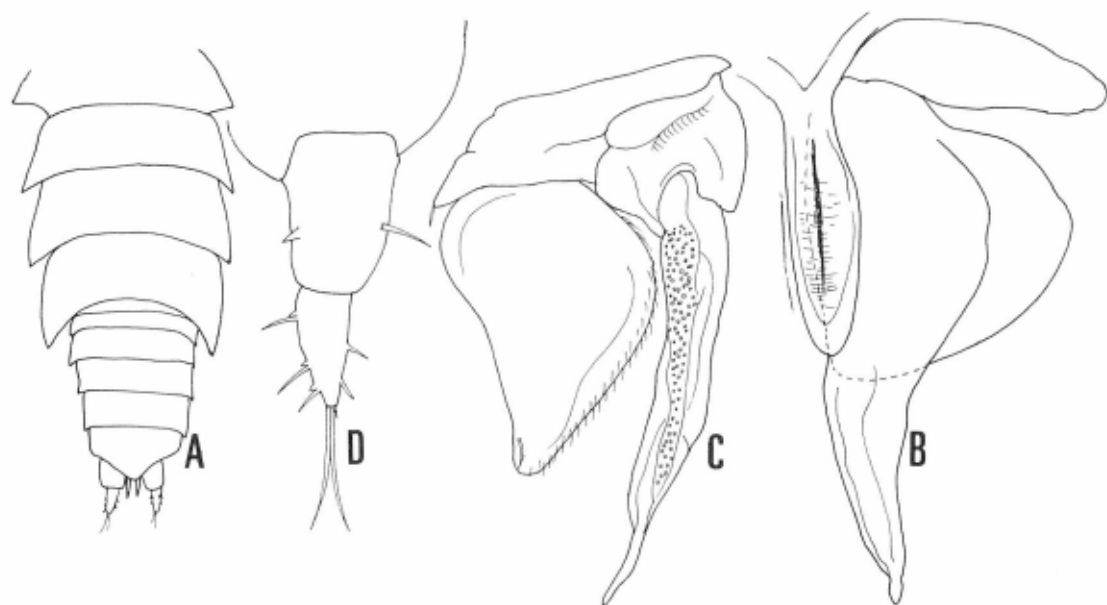


Fig. 26. *Trichoniscus* sp.2

A. Dorsal view of posterior part of the body; B. Penes and male first pleopod, C. Male second pleopod ; D. Uropod. (All. Male specimen from Uotsuri-jima).

Genus *Haplophthalmus* SCHÖBL, 1860

(Jap. name : Naga-warajimushi-zoku, new)

Body flat or moderately convex, sculptured dorsally with longitudinal ribs. Tubercles of cephalon feebly remarkable. Pleon not abruptly narrower than peraeon. Cephalon triangularly produced in the middle; lateral lobe large.

***Haplophthalmus danicus* BUDDE-LUND, 1879**

(Jap. name : Naga-warajimushi; new)

Fig. 27

Haplophthalmus danicus, Budde-Lund, 1879, ————, Budde-Lund, 1885; ————, Sars, 1899; ————, Verhoeff, 1908; ————, Arcangeli, 1923; ————, Lohmander, 1927; ————, Walker, 1927; ————, van Name, 1936; ————, Strouhal, 1954, ————, Vandel, 1957.
Haplophthalmus puteus Hay, 1889; ————, Richardson, 1905.
Haplophthalmus epirotius Strouhal, 1940.
Chavesia costulata Dollfus, 1889.

Material examined : 3 exs; Yuza-chō, Akumi-gun, Yamagata Pref., coll. Hiroshi Harada, Aug. 18, 1980; 3 exs, Karikawa, Yuza-chō, Akumi-gun, Yamagata Pref., coll. Hiroshi Harada Aug. 18, 1980; 1 ex, Sendai, Sendai City, Miyagi Pref., coll. Yuki Yoshi Mochida, Mar. 18, 1982; many specimens, Sasazu, Edozaki-chō, Ibaragi Pref., coll. Hiroshi Kobari, May, 19, 1981; 4 exs, Nurido, Ryugasaki City, Ibaragi Pref., coll. Hiroshi Kobari, May, 19, 1981; 3 exs, Ooshima Park, Izu-ooshima, Tokyo Pref., coll. Akihisa Andō, Dec. 2, 1982; 9 exs, Saito, Miharu-chō, Tamura-gun, Fukushima Pref., coll. Hiroshi Kobari, Mar. 15, 1981; 3 exs, Fushiki, Takaoka City, Toyama Pref., coll. Noboru Nunomura, July 12, 1981; 1 ex Tokiwa-machi, Kanazawa City, Ishikawa Pref., coll. Noboru Nunomura, May 10, 1981; 6 exs, Kiwatari, Yoshinodani-mura, Ishikawa-gun, Ishikawa Pref., coll. Shingo Tanaka, May 11, 1981; 5 exs, Tōjinbō, Mikuni-machi, Sakai-gun, Fukui Pref., coll. Noboru Nunomura, Nov. 23, 1981; many specimens, Wakasa-hime-jinja, Obama City, Fukui Pref., coll. Shingo Tanaka, May 11, 1981; 1 ex, Tsubata-miya, Tsu City, Mie Pref., coll. unknown, Aug. 26, 1979; many specimens, Shinmachi, Kita Park, Nishi-ku, Osaka City, Osaka Pref., coll. Junichi Aoki, Feb. 20, 1982.

Description : Body 4 mm in length, about 3.0 times as long as wide. Peraeonal somites with 8 to 10 raised rows of longitudinal ribs or tubercles, at least 6 of which are well marked. Epimera well developed and spreads outerwards. Body colour yellowish-white in alcohol. Eyes small, each consisting of a single ocellus.

First antenna 3-segmented; first segment stout with a seta; second segment rectangular with a seta; terminal segment with 5 aesthetascs at the tip. Second antenna (Fig. 27 C); first to third segments short and almost square in shape; fourth segment rectangular; fifth segment oblong; flagellum composed of 3 segments.

Right mandible (Fig. 27D); pars incisiva composed of 2 strong teeth; lacina mobilis

composed of 4 teeth at the tip; a hairy seta between lacina mobilis and processus molaris. Left mandible; pars incisiva composed of 2 strong teeth; lacina mobilis composed of 2 strong teeth; 2 hairy setae between lacina mobilis and processus molaris. First maxilla (Fig. 27E) slender; outer lobe with 6 teeth at tip; inner lobe with 3 hairy bristles at the tip. Second maxilla (Fig. 27F) weakly divided; inner lobe with 9 setae at the tip and outer lobe with 4 setae at the tip. Maxilliped (Fig. 27G); palp not segmented, with many long setae on the margin; endopodite truncate in apical margin and with many long setae at the tip.

Seventh pereopod (Fig. 27H); basis rectangular ischium elongated triangular with many hairs on inner margin and a few of setae on distal margin; merus rectangular with 3 stout setae on inner margin and 3 setae on lateral sides; carpus square with 2 protuberances, a big

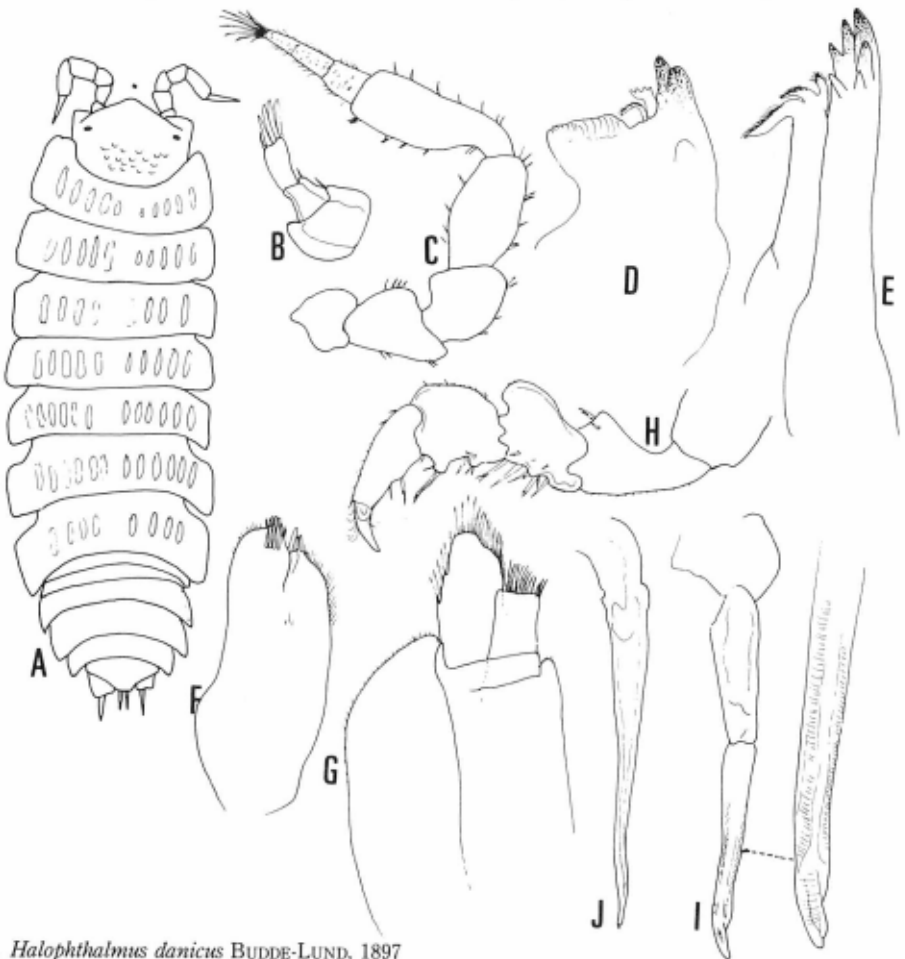


Fig. 27. *Halophthalmus danicus* BUDDE-LUND, 1897

A. Dorsal view; B. First antenna; C. Second antenna; D. Right mandible; E. First maxilla; F. Second maxilla; G. Maxilliped; H. Male seventh pereopod; I. Endopodite of male first pleopod; J. Endopodite of male second pleopod. (All: Male specimens from Osaka City).

seta and 5 setae on inner margin ; propodus relatively short.

Endopodite of male first pleopod (Fig. 27I) long. Endopodite of male second pleopod (Fig. 27J) similarly long with a small process at the tip.

Remarks : This species is widely distributed in Europe, North America, Asia Minor. In that many species of the genus is distributed only in Europe, it is likely that the present species has been transported from Europe to other places including Japan in recent years.



Fig. 28. Map showing the geographical distributions of eight species of the Family Trichoniscidae.

Family Olbrinidae BUDDE-LUND, 1913

(Jap. name : Higenaga-warajimushi-ka, new)

Genus *Olbrinus* BUDDE-LUND, 1913

(Jap. name : Higenaga-warajimushi-zoku, new)

The Olbrinidae is characterized by having a multiarticulate flagellum of second antenna. Pleopods seem to be useful for respiration in marine life. The family contains a single genus *Olbrinus*, and hitherto 6 species have been known from the Indian Ocean and the tropical Pacific Ocean. This is the first record of the family in Japan.

***Olbrinus elongatus*, n. sp.**

(Jap. name ; Hosohigenaga-warajimushi, new)

Figs. 29 and 30

Material examined : 1♂, 8.0 mm in body length except both antennae, under the stones of coral reef, 200 m off shore, Maeda-misaki, Onna-son, Kunigami-gun, Okinawa Island, Okinawa Pref., coll. Yasuhiro Nakajima Mar. 26, 1975. Type specimen is deposited at the Toyama Science Museum (TOYA—Cr—1842).

Description : Body slender, about 4.5 times as long as wide, especially uropod very long and occupies 30% of body length. Body colour white in alcohol.

First antenna (Fig. 30A) small and 3-segments; terminal segment oblong with 8 aesthetascs at the tip. Second antenna (Fig. 30B) very long and reaches the fifth pereopodal somite; peduncle composed of 5 segments, first to third segments are relatively short but fourth and fifth segments are very long; flagellum long and composed of 15 segments.

Eyes relatively small and each composed of about 20 ocelli.

Right mandible simple; pars incisiva stout 3-segmented; lacina mobilis small, not chitinized, and with 3 teeth at the tip; several hairy bristles are found but processus molaris is not distinct. Left mandible (Fig. 29B) alike to the right one; pars incisiva stout and 3-headed; 4 hairy bristles are found but no distinct lacina mobilis nor processus molaris can be observed. First maxilla (Fig. 29C-D) rather slender; outer lobe with about 7 setae and 5 small protuberances on distal end; inner lobe thinner and shorter than the outer lobe and with many hairs at the tip. Second maxilla oblong with a dozen setae on outer margin and with many hairs on inner margin. Maxilliped rather big.

Penes (Fig. 29F) rather wide and almost rectangular without any ornamentation on the surface.

Male first pleopod (Fig. 29F); endopodite pretty stout and with bar-like projections in the distal half. Male second pleopod (Fig. 29G); endopodite long with a small projection at the tip; exopodite rounded and triangular with many hairs on the margin.

Habitat : The present new species was collected under a rock of coral reef of intertidal zone, 200 m off shore. Such a place, of course, submerged at high tide. They might live in the air under the rock, and might be able to live in the sea water in pretty long time.

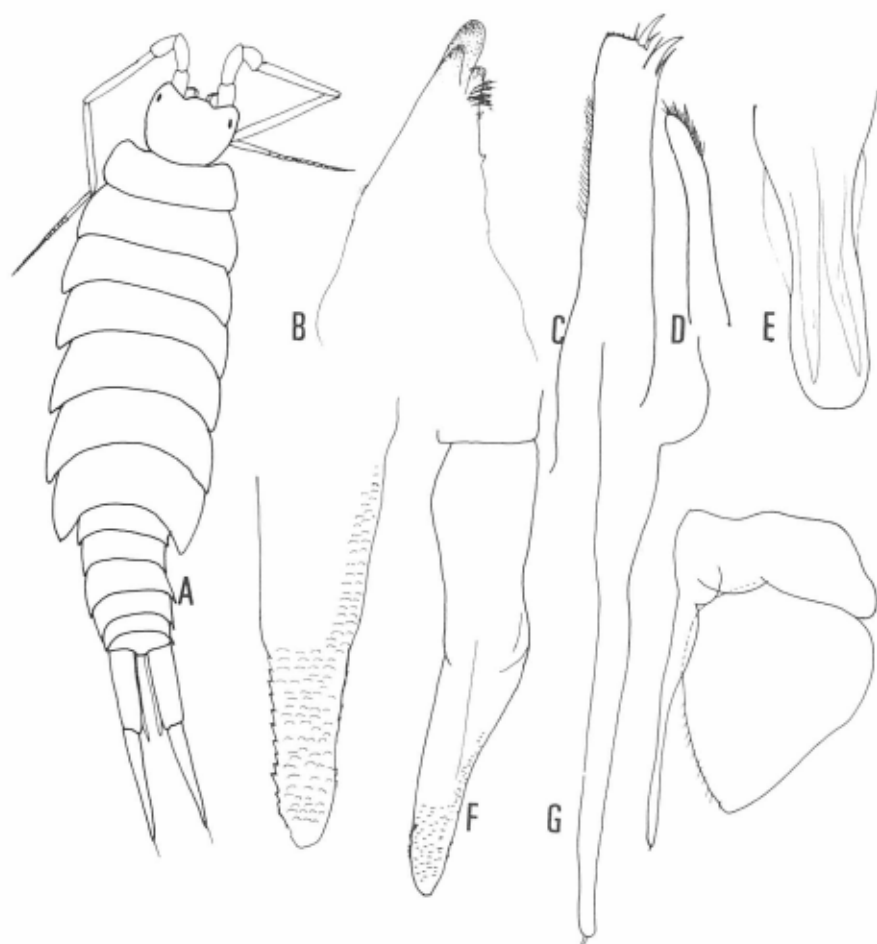


Fig. 29. *Olbrinus elongatus*, n. sp.

A. Dorsal view ; B. Left mandible ; C. Outer lobe of first maxilla ; D. Inner lobe of the same ; E. Penes ;
F. Endopodite of male first pleopod ; G. Male second pleopod (All : Holotype male).

Remarks : The present new species, though distinguishable from any other congeners by its extremely long uropod and telson, seems most closely allied to *O. mangroviarum* from the Solomons, but the former is different from the latter in the following features ; (1) elongated body shape, especially long uropod, (2) lack in pigments on the dorsal surface, and (3) more numerous ocelli in eyes.

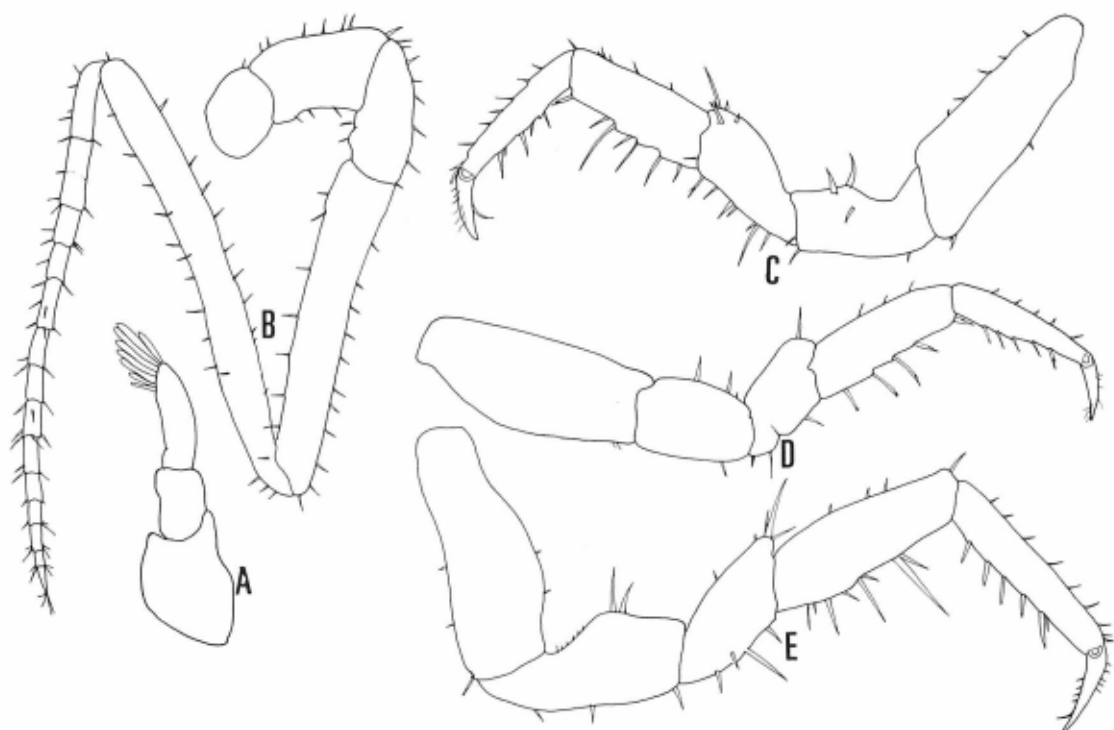


Fig. 30. *Olbrinus elongatus*, n. sp.

A. First antenna; B. Second antenna; C-D. Second to third pereopods; E. Seventh pereopod.
(All: Holotype male).

N.B. References to the literature will be given at the end of the last paper of this series of publications.